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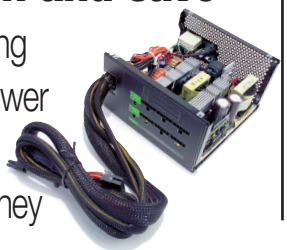

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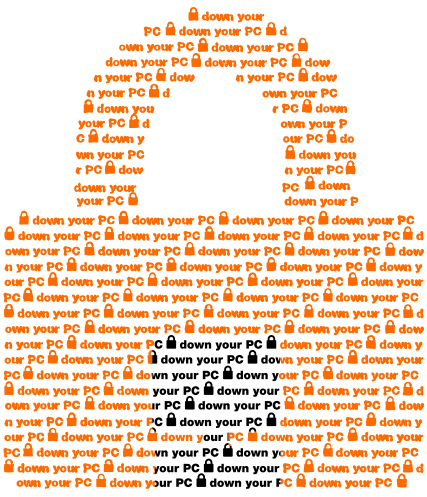

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Editorial

kelvyn.taylor@incisivemedia.com

A stitch in time saves money

Now could be the moment to update your PC's power supply or digitise those old VHS tapes before they go mouldy

Over the years I've been fairly lucky with my PC hardware, with only a couple of major catastrophes. Most of the time, the incidents have been entirely my own fault. For example, one catastrophic breakdown was caused by me experimenting with overclocking in the early days when motherboards appeared with user-tweakable front-side bus and voltage settings.

I chose a silly combination of values that caused errors on the PCI bus and managed to corrupt my hard disk and lose a years' worth of accounts data. Another time I managed to kill a motherboard by inserting a processor with a bent pin that somehow managed to short out some vital circuitry.

Earlier this year, I started getting increasingly regular OS lockups, blue screens and sometimes even random reboots. Having seen such errors in the past caused by defective or badly-seated memory modules, I tried different memory, cleaned the modules, but all to no avail.

'When I turned the PC on there was an enormous bang and a horrible smell...'

I started to think there might be something wrong with Vista or a device driver. However, checking the Reliability and Performance monitor showed nothing obvious.

Then one day, when I turned the PC on there was an enormous bang and a horrible smell of fried electrics. I realised that the power supply – a trusty but old Antec model that had given me well over four years of almost continuous service – had finally given up the ghost.

Thankfully all the safety features and fuses had worked and there was no damage to the motherboard or other components, so I bought a replacement and was up and running again in no time. And magically, all the previous problems disappeared. It then became clear what was the most likely cause of my PC's illness – the PSU was on its last legs and had been giving warning signs.

The PSU is probably the most-neglected part of a PC, rarely getting any attention except when things go wrong. As I discovered, a faulty PSU can cause all manner of strange problems. I had probably been looking after mine better than most, regularly cleaning out accumulated dust and gunge from the fans, but they certainly won't go on forever.

In these days when there's more incentive for PCs to remain on longer each day – whether for scheduled software updates, virus scans or even recording TV programs at odd hours – there are increasing demands placed on the PSU. And with spiralling electricity costs, that extra computing time is getting more expensive, so this month we've taken a look at how upgrading to a modern power-efficient PSU could help you save some of that money – turn to page 50 for the full story.

Our feature on converting VHS to DVD comes at a timely moment, with stories of a plague of tape-eating fungus recently hitting the news headlines. Given a rash of damp summers and widespread flooding, it could well be worthwhile checking out those stashes of old tapes in the loft or garage, and digitising them before the contents are lost forever.

With modern equipment such as the new Ion USB VCR 2 PC (reviewed on page 68), it's easier than ever to archive your videotapes and preserve them on DVDs for future generations. Turn to page 29 now to find out how to get started.

Finally, a big thanks to all those who nominated products for the British Technology Awards. The finalists have now been decided and it's time to cast your final votes – see page 15 for more details. **PCW**

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BT to boost broadband speeds

BT is to roll out fibre-based broadband services to up to 10 million homes over the next three years, with top speeds hitting 100Mbits/sec and the potential for 1Gbits/sec in future.

The full 100Mbits/sec will be available only to houses built on new sites, where fibre will be taken to the premises (FTTP). Services to existing houses will take fibre only to street cabinets (FTTC), when top speeds will be 40Mbits/sec, although this may rise to 60Mbits/sec using new technology.

The fibre rollout is only part of a revamp that will see Britain's communications infrastructure shift up a gear. Cable operator Virgin Media says it will also able offer 50Mbits/sec links to 12 million homes by the middle of next year as part of a £13bn programme.

BT's FTTC setup is closest to the one generally used by Virgin Media, except that it uses existing phone lines from the cabinet to the home, whereas its rival uses more suitable coax. This gives Virgin Media more headroom on FTTC links.

A spokesman for BT said it had yet to decide what technology will be used for this section, but it will be a flavour of DSL – ADSL2+ or VDSL. Uplink as well as downlink speeds will rise, which could encourage more use of video telephony and help businesses.

Real throughput is also likely to be closer to the link's rated speed, because the troublesome copper link will generally be much shorter than on current ADSL connections.

However, there was a note of doubt in the BT statement announcing the plans. It said they depended on Ofcom "removing current barriers to investment and making sure that anyone who chooses to invest in fibre can earn a fair rate of return for their shareholders."

BT's announcement was welcomed by Ofcom chief executive Ed Richards. He said: "These new networks will be a critical part of the UK's infrastructure and will change our experience of communications. They will support and deliver innovative applications and services, as well as help create new opportunities for businesses of all kinds."

BT chief executive Ian Livingston promised the company will aim to ensure its investment will benefit those in the country as well as in towns. He said: "We want to work with local and regional bodies to decide where and when we should focus the deployment."

But what will happen when the data gets home?

Lost in the fuss about faster web links is the thorny problem of how to extend them round homes without shouting down the neighbours. BT ads hype its smart new Home Hub as giving better Wifi coverage than kit from any other UK broadband provider. This means simply that BT believes it is the first provider to bundle 11n Wifi, available on other hardware for months.

BT's flash new Home Hub will increase the use of 11n Wifi

BT's hub will increase use of 11n, and it can improve Wifi ranges, but this also increases the area in which it can cause interference. And getting the full 11n speed involves hogging two channels, potentially causing more contention; this is switched off by default in the 2.4GHz bands, where crowding is already a problem, but less scrupulous users can switch it on.

BT executives are confident that 11n contention will not be a major issue, even when people start throwing in high-definition TV. But nobody seems sure what will happen as 11n scales up in city blocks where hundreds of users may be within range.

BT's alternative, adapters that use house mains wiring to carry data, came under fire last month at its annual general meeting, where radio enthusiasts complained they are interfering with high-frequency signals. Richard Williams, an electromagnetic compatibility consultant, said BT's powerline adapter broke its own guidelines because it could not be certified to an EC standard. He said it "had been a concern to many professional and other user groups".

For more on the hub, see **www.pcw.co.uk/2221580**

Centrino 2 speeds up graphics

Intel has launched a new generation of the Centrino mobile platform, codenamed Montevina and now branded Centrino 2. It is essentially a bundle of new technologies designed for notebooks, as opposed to smaller netbooks, nettops and Mobile Internet Devices (MIDs) powered by the new low-drain Atom chips.

All these devices will run PC software, though some MIDs may be thin clients acting primarily as an web front end. Apple's iPhone and iTouch can be seen as MIDs but they use ARM cores, so Intel is entering a new competitive arena (see page 16).

Vendors evidently hope that by giving new names to these small formats they won't undercut the market for larger, more expensive Centrino 2 products.

Centrino 2 comes with a choice of five new 45nm Core 2 Duos: the 2.26GHz P9400, 2.4GHz P9500, 2.53GHz P9600, 2.53GHz T9400, 2.8GHz T9400, and the 3.06 Core 2 Extreme X9100. Bulk prices are respectively $281, $241, $348, $316, $530, $851.

P part numbers signify chips optimised for power drain; T and X parts are tuned for performance.

A new Mobile Intel 45 Express chipset supports a 1,066MHz front-side bus and DDR3 memory. The integrated GMA X4500 graphics is said to be 1.9 times faster than its X3100 predecessor. It supports any discrete graphics card, yoking it to on-board graphics for extra performance as needed, otherwise switching it off to save power. Nvidia's hybrid system does this too, but only with Nvidia cards.

Centrino 2 supports Gigabit Ethernet and up to 2GB of Turbo Flash memory, which can be used to speed up common tasks.

- Questions as Wimax misses Centrino 2 – page 17.
- Update on Nehalem, new Intel architecture launching later this year – page 16.
- Intel admits code is hobbling multicores – page 16.

Vendors rush out notebooks supporting new platform

Major notebook vendors including Lenovo, Sony, Samsung, Rock, Acer, Novatech and Medion all unveiled Centrino 2 laptops when the platform was launched. Sony's Vaio BZ-series pack a 15.4in and magnesium allow case and weigh what is described as a "comfortable and practical" 2.7Kg.

Samsung's 17in R710 weighs still more at 3.08Kg, though the company says it one of the lightest of its class. The R710 is the biggest of five new series, the R560, R510, R310 and R210 with screen sizes going down to 12.1in. Rock focuses on models with the Xtreme 780 and Xtreme 620 models using the Extreme X9100 processor, and the Pegasus 520 and 320 using the T9600.

Medion will sell its Akoya S5610 laptop through Sainsbury's for £599.99 inc Vat. It comes with a dual-layer DVD, 3GB of Ram and a 320GB drive.

Acer picture – see page 13; Novatech review page 56.

Centrino 2 laptops, from left: Samsung R560, Sony Vaio BZ, Medio Akoya S5610 and Rock Xtreme 620

Intel dismisses new EU charges as an AMD plot

European regulators have outlined new charges against Intel that could cost the chipmaker up to 10 per cent of its annual turnover.

It is accused of offering discounts to a major European PC distributor to favour its products over AMD's, and paying a PC manufacturer to use its chips and to delay marketing a range using AMD chips. Regulators claim Intel's actions were part of a co-ordinated effort to undermine its main competitor. Intel has eight weeks to respond and has the right to seek a subsequent hearing.

Intel claimed the "unfounded" accusations were part of a long-running AMD strategy to undermine its position.

In February EU officials raided Intel offices in Germany in search of evidence that the company had abused its market position.

Two PC firms go under

Two UK companies have gone bust in the past month after being hit by the economic downturn.

The Bracknell-based UK division of Maxdata closed with the loss of 12 jobs after the German parent company of filed for insolvency in Essen. However, the Benelux division will take over sales and orders. Support will continue.

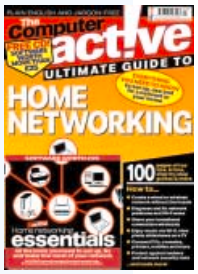
Also closing is V-Solutions Ltd, the company behind games PC vendor Vadim Computers. Director Vadim Chobanu says that it went into voluntary liquidation partly because of the "credit crunch".

Sony-Ericsson cuts jobs

Sony Ericsson cut 2,000 jobs worldwide – 17 per cent of its staff – after profits fell to $9.5m in the three months up to July, compared with $348.8m in the same period last year. Analysts blamed its focus on high-end phones whereas rivals like Nokia have fought off the Apple challenge by selling entry-level models to emerging markets.

→ **www.pcw.co.uk/2222100**

Network guide



The Ultimate Guide to Home Networking, published by our sister magazine Computeractive, provides a step-by-step guide to setting up a network in your home. It details what you will need, how to put it together, how to share files and a web connection, how to make it secure, and how to stream music or video to your TV.

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Apple getting too big for its Boot Camp?

Clive Akass had just resolved to learn to love big Apple when he got into a tangle with Quicktime. Now he wonders if the company has caught Microsoft's old arrogance

A reader's letter (see page 20) suggesting that I am anti-Apple touched a sore point, as I had been fretting about whether I was guilty of prejudice. The excitement about the new 3G iPhone (see our review on page 63) is only the latest indication that Apple is setting the pace for hardware and interface design in the formats it has chosen to address.

I resolved as I wrote up last month's news that I would forget the irritations I have with the company and concentrate on its achievements. Then, when downloading a .tif image in the rush to meet my deadline, I found myself yet again confronting an Apple issue. At some point I must have clicked OK to an Apple Quicktime upgrade on my Windows PC; it had plugged itself into Explorer and signed itself up to open a variety of file formats.

Quicktime opened the .tif within Explorer, no problem; but when I right clicked to save it to disk I got a prompt offering me two choices: Save as source, or Save as a Quicktime Movie. A .tif is not a movie, so I clicked Save as Source as the option that came closest to making sense. I was then presented with a prompt saying that to save this 'movie' I needed to buy Quicktime Pro (£20 from Apple UK).

Explorer will happily save this .tif under the standard Windows file associations, so Apple was asking me to pay for functionality that I already had, but which its own software had switched off.

It had wasted my time but not my money, because I knew enough to realise what had happened. But many busy users might have bought a program they did not need because it was the only way they could see to get the job done.

Retrying all this later I found that if I changed the file association within the Quicktime control panel, the software simply switched it back again. Switching Quicktime off in Explorer means the picture will not even render in the browser. Only by using the Windows control (My Computer> Tools> Options> File Types) could I persuade the PC not to open .tifs using Quicktime.

Apple may not be guilty of deliberate deception here but it could still be on dodgy legal grounds. Recent rulings on phone-in scandals held companies guilty of institutional laxity when they profited from breaches of public trust even if these appeared to be mistakes. Ofcom says it has no jurisdiction in the matter. The Advertising Standards Authority (ASA) said the Quicktime Pro prompt could be construed as an advert, but it could make no ruling unless I submitted a formal complaint.

Quicktime... hijacking Windows functionality

I don't want to get involved in an extended feud with Apple. This is a complex issue – Windows may open some .tifs but not others, for instance – and Quicktime is not the only utility to hijack functionality. There is a need for ground rules (such as 'you must always match the functionality you are purporting to replace'), and the ASA may not the best body to set them.

Perhaps Apple would have a simple explanation, a fix, and a pledge to police itself properly in future? I asked the company for a comment. More than a week later I had not had so much as an acknowledgement of my email to Apple's European press office. Emails to its London PR team elicited an admission that my first email had been received.

Three weeks later, after several emails and calls, I have yet to get a response. I told Apple my deadlines, so I take this as a refusal to comment. To put it more strongly: it seems Apple is turning a deaf ear not just to me, but to thousands of *PCW* readers.

Resurgent Apple seems to be infected with an arrogance exceeding even that of Microsoft in its bully-boy days of near absolute dominance. Microsoft was always good for a comment, even if you didn't like what it said. What is astonishing is how Apple gets away with it. If Microsoft did to Macs what Quicktime does to Windows there would be lynch-mobs of Apple users heading for Redmond. It's hard to say a word against Apple on the web without getting flamed, often beyond reason (and I exclude here the excellent and thoughtful letter we print today on page 20).

But Apple won't be able to carry on like this indefinitely. It will get its comeuppance, just as Microsoft did.

One million iPhones sold in three days

There is no denying Apple's success. More than one million 3G iPhones were sold in the three days after launch – 300,000 more than the first model sold in a year.

The company reported yet another earnings record for the three months up to July, logging $7.46bn (£3.75bn) in revenue £540m profit.

Apple became a victim of its own success at the launch of the new handset. So many people bought the phone that activation servers became overloaded and so people could not use them.

The 3G iPhone (reviewed on page 63) is currently available only from 02 or Carphone Warehouse to people on monthly 02 contracts; prices range from free to £159, depending on contract.

A million 3G iPhones have so far been sold

In brief

Kids get too Lively

A new Google 3D world platform called Lively, designed to be safe for teenagers to use, turned out to be too lively in practice.

The platform allows users to design and operate small 3D rooms, which can be embedded into blogs and websites. Unlike Second Life, in which youngsters are not allowed, Google promised that Lively will not allow explicit content. It is open to users as young as 13 and has strict controls to tackle bullying. However, soon after its launch, two of its five most crowded rooms – one with 3,724 occupants – had 'sex' in their titles and descriptions. Other rooms were advertising such themes as 'cyber sex' and 'hot college girls'.

→ **www.pcw.co.uk/2221222**

Hyper pioneer

NEC has become the first PC manufacturer to adopt Bios-specialist Phoenix's Hyperspace, a virtualised operating environment that allows instant-on applications to run alongside Windows. The system also allows users access to facilities such as email without booting to Windows. NEC will use it for enhanced security, since it allows checks to be made before, during and after boot-up.

Opera beta

Opera has unveiled a beta version of its latest mobile browser, Opera Mobile 9.5, for Windows Mobile and some Series 60 handsets. Opera Mobile is accompanied by a free, lower-end version known as Opera Mini.

Opera has revamped the user interface and says the new version is "the most standards-compliant mobile browser available", as well as one of the fastest.

Firefox record

Firefox 3.0 succeeded last month in setting the world record for the number of downloads in 24 hours. Guinness World Records endorsed Firefox's total of 8,002,530 downloads.

→ **www.pcw.co.uk/2220649**

ODF 'has won formats war'

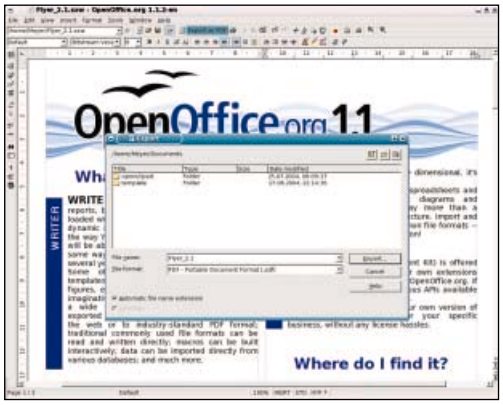
Microsoft may have won the battle to get its new Open Office XML (OOXML) formats voted an international ISO standard, but the future belongs to the rival Open Document Format (ODF), according to Britain's representative on the voting panel.

Dr Alex Brown was dubbed a Microsoft lackey by bloggers because of his position as convenor in the ISO 29500 ballot resolution process, which approved OOXML.

The vote, which is subject to an appeal, followed a campaign during which Microsoft was accused of packing committees in a bid to lock organisations into its technology.

Microsoft now says ODF will be supported natively in an Office Service Pack 2 update next year, though it will not support some parts of its own OOXML formats.

Dr Brown said this ODF option meant OOXML would take second place in future. He believes OOXML would be used primarily for compatibility with the vast accumulation of Office documents based the old binary formats.



Microsoft Office is to offer native support for the ODF formats used by rival suites such as the free Open Office

Dr Brown said companies that lock users into their products are no longer tolerated. Whatever Microsoft's motivations, users would benefit when Office, easily the most used office software, aligns itself with open, documented standards.

His words echo those of Stuart McKee, Microsoft's national technology officer, who admitted the company would have done better to have got involved in the standards process earlier than it did. He was reported to have told a Red Hat summit: "ODF has won."

Microsoft leasing bundle not for UK

Microsoft has no plans to extend to Britain a deal allowing people to use three copies of the Student and Home edition of Office, Live web services and Onecare security for $70 (£35) a year.

The Student Edition includes Word, Excel, Powerpoint and Onenote, but not Outlook; Windows Live web services include webmail, instant messaging and photo hosting.

The US deal, called Equipt, includes three licences and works out at around £12 per machine (or user) a year. It could be seen as an indication of pressure on Microsoft pricing, but also as a bid to coax people into using its web services.

It may not be coming to Britain yet, but Microsoft has revamped the pricing of its corporate software-as-a-service deals, offering two new subscriptions suites including Exchange Online, Sharepoint Online, Office Communications Online, Live Meeting and Dynamics CRM Online. For more on that, see **www.pcw.co.uk/2221078**.

Quark barks Adobe's tunes in new Xpress publisher

A new version of the Quark Xpress publishing package represents the latest salvo in what many see as a battle of survival with mighty Adobe.

Xpress dominated magazine and newspaper publishing for more than a decade after outclassing Aldus Pagemaker, which faded from view.

Adobe launched Indesign in 1999 and began to gather market share, as it was integrated with complementary packages such as Illustrator and Photoshop. These were also bundled as Adobe Creative Suite, which is now on version 3 (CS3).

Quark was slow to adapt to the competition, but began tightening up its act and Xpress 7.0 was well received.

Quark Xpress 8, which launches this month, now goes further to boost its own links with CS3, working with Adobe Bridge and offering native support for Photoshop and Illustrator files.

A new interface is intended to make it faster and easier to design and publish to print or the web, with support for Flash and PDFs. Xpress tools have become smarter, so you don't need to switch from one to the other, and you can now drag and drop pictures into a layout.

Xpress 8 offers web and print tools

Patch cuts web for thousands

Tens of thousands of people were cut off from the web last month by a Microsoft patch designed to plug a newly-discovered hole in internet security.

All users, Microsoft or not, were affected by the flaw in the Domain Name System (DNS) protocols, which could have allowed attackers to redirect traffic from legitimate sites to criminal imitations.

But Microsoft's cure, in update KB951748, was worse than the disease for users of Zonealarm (ZA) firewall products, including the free basic edition. It changed the range of ports used for DNS calls to include ones blocked by ZA.

Publisher Checkpoint was apparently not informed of the change. But ZA users found out as soon as they tried to get access, because they were cut off. Fixes have now been posted at **www.tinyurl.com/6ceewk**.

The flaw that caused all the trouble was discovered by accident six months ago by researcher Dan Laminsky, of security specialist IOActive, but it was kept under wraps to allow a defence to be developed.

Several software vendors, including Microsoft, issued patches simultaneously in what the US Computer Security Response Team described as "the largest synchronized security upgrade in the history of the internet".

The scale of the response reflected the fact that unlike most security holes that affect individual machines or products, the Kaminsky flaw involved basic internet architecture.

New tool 'makes code tamper-proof'

A new tool can prevent piracy of both software and digital content by making code practically tamper-proof, the developers claim.

Metafortress, from Glasgow-based Metaforic, injects a web of interdependent checksums into code, making it virtually impossible to alter undetected and very difficult to reverse-engineer, says chief technology officer Neil Stewart.

It protects content such as music tracks or video by protecting the media-player software, the usual point of attack for someone trying to crack a digital rights management (DRM) system.

Metafortress will foil a code cracker who tries to disable the DRM system in a way that will not produce a tell-tale checksum error. It also facilitates the obfuscation of code to thwart anyone who tries to disassemble it as a route to breaking the anti-piracy 'wrapper' around copyright content.

Metafortress is used at the stage at which source code is compiled for the final product, so it can be used on products targeted at any platform. Currently it supports all flavours of C++ source code; Java and C# versions will be available soon.

→ **www.pcw.co.uk/2221295**

Favourite apps at your fingertips

Acer's latest Travelmate notebooks using Intel's latest Centrino 2 platform (see page 9) extends the use of the fingerprint reader. You can use different fingers to launch different applications or protected documents.

Pictured is the 17in Travelmate 7730G, which comes with a choice of Centrino 2 processors, and disk options with capacities up to 320GB. Acer also launched two new Aspire consumer notebooks, the 15.4in 5930 and the 12in 2930, both using the Centrino 2 platform.

Acer's Travelmate uses fingerprint technology

Lords repeat e-fraud calls

A House of Lords committee wants the Government to do more to protect people from online crime.

It called for legislation to hold banks responsible for losses from e-fraud, allow people to report e-fraud directly to police, and force organisations to report data losses.

Similar recommendations were made in a report, Personal Internet Security, published last year by a Science and Technology sub-committee. Members later said the Government took no notice.

The committee was told banks often refuse refunds for frauds involving a PIN or password, claiming the customer must have been negligent or complicit.

→ **www.pcw.co.uk/2221089**

In brief

P2P malware

A new type of malware targets file sharers by infecting multimedia files, says Secure Computing. An initial infection occurs when a user visits a 'warez' site seeking an illegal key to run copy-protected software. A Trojan infects every multimedia file on the PC, from where it can spread to other machines by P2P.

→ **www.pcw.co.uk/2221574**

Firefox safest

Users of the Firefox browser are most likely to have the latest security updates, according to a study by researchers at the Swiss Computer Engineering and Networks Laboratory, along with IBM and Google. It found that just over 83 per cent of

Firefox users, 65.3 per cent of Safari users, 56.1 per cent of Opera users and 47.6 per cent of Internet Explorer users had fully patched browsers.

Word attacked

Microsoft has warned of a wave of attacks that crash Word by using a document specially-crafted to cause a memory overflow error, allowing the attacker to execute code remotely. Microsoft said the vulnerability affects only in Office Word 2002 Service Pack 3.

→ **www.pcw.co.uk/2221200**

Rogue lockout

San Francisco officials were unable to gain access to their network after a technician deleted all administrator passwords except his own after a run-in with the head of security. He was charged on four counts of misusing computer systems.

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Vote now for the best products of 2008

The finalists have been announced – now's your last chance to pick the winners and become a winner yourself

Thanks to a great response from PCW readers, the shortlist for the British Technology Awards 2008 is now live online and open for the final round of public voting.

Below we've listed all the nominations in each category – to vote for your favourites, simply go to **www.britishtechnologyawards.co.uk**.

The winners will be announced on 3 October 2008. See the BTA website for terms and conditions.

WIN GREAT PRIZES!

Everyone who votes could be in with a chance of winning £1,000 worth of prizes. Simply provide your contact details (name and email address) so we can contact you if you're a lucky winner.
Full details of the prize winners will be posted on the BTA website in October. Voting closes on 12 September 2008.

THE FULL LIST OF NOMINEES

Gadget of the Year
Apple iPhone
Apple iPod Touch
Tomtom Go 720
Nokia N95
Blackberry Curve
Fujifilm F100fd
Archos 605
Slingbox

Best Music Technology
Apple iTunes
Windows Media Player 11
Audacity
Play.com
Guitar Hero
Ion USB turntable
Creative X-Fi
Napster

Best Gaming Technology
Nintendo Wii
Nintendo Wii Fit
Sony PS3
Microsoft Xbox 360
Microsoft Flight Simulator X
Nintendo DS
Guitar Hero
Sony PSP

Best Kids' Technology
Nintendo DS
Windows Vista parental controls
Advent Kids laptop
Scalextric Digital
Hornby DCC trainsets
Lego Mindstorms NXT
Fisher Price Kid Tough camera
Bebo

Best Home Entertainment Technology
BBC iPlayer
Nintendo Wii
Freeview
Sky
Panasonic Viera HDTV series
Sony Bravia HD LCD TVs
Sony PS3
Microsoft Xbox 360

Most Stylish Technology
Apple iPhone
Apple Macbook Air
Sony Vaio TZ
Acer Ferrari ultraportable laptop
Canon SX100 IS camera
LG Viewty
Dell XPS One
Samsung LE series LCD TVs

Best Mobile Technology
Apple iPhone
Nintendo DS
RIM Blackberry Curve
Nokia N810
Asus Eee PC
Sony PSP
Google Mobile
Samsung Q1 Ultra

Business Technology of the Year
Asus Eee PC3
3G USB Modem
RIM Blackberry Curve
Panasonic Toughbook
Vodafone USB 3G modem
Intel Xeon L5400 quad-core CPU
HP Compaq ultra-slim dc7800 PC
Microsoft Windows Server 2008

Most Indispensable Technology
Google Maps
BT Broadband
Apple iPod
BBC iPlayer
Sky
Apple iPhone
Virgin Media
Facebook

Technological Innovation of the Year
Apple iPhone
Windows Vista
Intel Core 2 Quad processors
Apple Macbook Air
Asus Eee PC
Adobe Photoshop Express
Belkin Wireless USB Hub
Google Docs/Apps

Best Online Technology
BBC iPlayer
Skype
Youtube
Facebook
Google Docs
Windows Live
BT Digital Vault
Pinnacle PCTV to go

Retailer of the Year
Amazon
Play.com
John Lewis
Ebuyer
Tesco Direct
PC World
Maplins
Argos

Greenest Technology of the Year
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Intel rules but AMD still OK

Intel has continued to dominate the processor market in this year, although rival chip manufacturer AMD has good reason to be optimistic for the long term, according to market intelligence company iSuppli.

Intel's market share rose slightly from 78.5 per cent in the fourth quarter of last year to 79.7 per cent in the first quarter of this year, while AMD's dropped from 14.1 per cent to 13 per cent .

However, iSuppli noted that AMD's share for the first quarter was 2.2 per cent up on the same period last year, while Intel's dropped 0.7 per cent.

Matthew Wilkins, principal compute platforms analyst at iSuppli, said: "AMD's PC microprocessor product portfolio has become much stronger during the past year, particularly on the desktop side.

"At the beginning of the year, we saw AMD add quad-core Phenom microprocessors to its desktop portfolio, which it has since built on with tri-core and dual-core flavours for the prosumer and business markets."

● AMD is expected to take an $880m (£440m) hit this quarter as an after-effect of its £2.7bn purchase of ATI in 2006.

See → **www.pcw.co.uk/2221478**

Shaun Nichols

Long-life Flash chips

Flash chips, which could last centuries, have been developed by Japanese scientists. Current products have a useful lifetime of around a decade if they undergo a lot of rewrites.

The new ferroelectric Nand flash can be scaled down to 10 nanometres or smaller, and work at lower voltages than conventional chips, according to scientists from the National Institute of Advanced Industrial Science and Technology and the University of Tokyo.

It can be rewritten more than 100 million times, compared to 10,000 times for current products.

Intel admits multicore snag

Big advances in parallel programming are needed for general-purpose computers to use the full power of multicore processors, Intel star technologist Pat Gelsinger has admitted.

The performance of chips processing one task at a time is improving by just 10 per cent to 15 per cent per generation, whereas parallel performance can be at least doubled – if it can be exploited. Gelsinger, vice-president of Intel's digital enterprise group, told a press teleconference: "We have to make some breakthroughs here."

Multicores could already benefit inherently parallel operations such as graphics, web servers and databases, while compilers were getting better at 'auto-generating' parallel code. Also improving were virtualisation environments in which each operating system and application can be single-threaded, but the aggregation of the workload can be multithreaded.

But Gelsinger went on: "We really do need to continue to offer new programming environments.

Intel's Pat Gelsinger has hopes for parallel programming

And the good news is that we have made real progress in the areas of parallel tools and support."

He made no reference to programming guru Donald Knuth's recent prediction that multicores could turn out to be a dead end. Knuth described as a pipedream the belief of hardware vendors that a coding magic bullet would come along to harness parallelism.

However, talking about the Playstation 3's massively parallel Cell processor, Gelsinger came close to echoing Knuth. He said the Cell had been launched as a radical new architecture, but that "years later, the application programmers have barely been able to comprehend how to write applications for it."

Gelsinger added that Intel would take a different approach with its soon to be launched Larabee graphics-processing unit (GPU). The core will use the familiar Intel architecture with a "graphics vector visualisation instruction set that has full support for the native programming models, and full support for APIs like DX and OpenGL, and the broad set of programming models to go with it."

The "passionate" response of Intel customers led him to believe that Nvidia's Cuda parallel-processing language and ATI's rival CTM would become footnotes in computing history.

Nvidia has been pushing Cuda, an extension of the C language, as a way of enabling coders to use low-cost GPUs to accelerate inherently parallel tasks.

No shying away from long ARM wrestle

Intel has a battle on its hands competing with ARM, its star technologist Pat Gelsinger has said. "ARM is a good architecture. It has proven success in the handset space," he told a press teleconference (see above).

Intel made a start in the arena with the low-drain Atom processor, said Gelsinger. But he appeared to get his figures twisted with a claim that the Atom had reduced the 5-6W thermal design power (TDP – a measure of the heat a system has to dissipate) of maximum-drain Centrinos to half a watt.

The TDP of the Atom 230 is listed as 4W and Atom N270's is 2.5W. The average power drain is closer to 0.5W.

According to ARM, its designs, and lower working power drain, are ahead on standby power. The maximum power in sleep mode of the N270 is listed as 0.5W, too high for handhelds to be left readily in instant-on standby.

Gelsinger said Intel planned to achieve "milliwatt idle performance" within a couple of years.

He also said Intel planned to use Atoms in systems-on-a-chip, but his main message was the familiarity and scope of the Intel architecture (IA) would see off the competition.

He asked: "Will IA displace ARM? It would be decades before that is a consideration because of the momentum [ARM] has. But we do see this… continued wall of IA, going from petaflop machines with Xeons down to milliwatt machines with Atoms."

Three Nehalem quad-cores this year

Intel will release three quad-core processors using its yet-to-be launched Nehalem architecture later this year, according to motherboard vendors in Taiwan.

The processors – codenamed XE, P1 and MS3 – will clock 3.2GHz, 2.93GHz and 2.66GHz respectively and have 8MB of level 3 cache and a thermal design power (TDP) of 130W, according to sources quoted by *Digitimes*. They will use Intel's LGA 1366 socket and a new chipset. Nehalem is a major architectural change, replacing the old front-side bus with a Quick Path Interconnect that works more like AMD's Hypertransport bus. It is expected to be between 15 per cent and 30 per cent faster than current designs.

Mobile Wimax down the drain?

A delay in implementing Wimax wireless links in Intel's new Centrino 2 platform (see page 9) has highlighted fears that they drain too much power for mobile use – and may explain why Intel appears to have warmed to rival LTE links.

Intel spokesman Alistair Kemp said at the London launch that Wimax drains "only a few milliwatts" more than Wifi. A difference of that order might make little difference in a notebook but it could be significant in a handheld.

Figures from Japan suggest that Wimax could draw at least 20 per cent more power than W-CDMA 3G links when transmitting. The problem lies in the amplifier used to boost signals for transmission. Wimax's Orthogonal Frequency Division Multiplexed (OFDM) signal peaks frequently at several times the average amplitude, resulting in a wide range of input levels. To cope with this without distortion, you get an amplifier with a very low power efficiency. In other words, you need to put much more power into the amplifier than you push out of the aerial.

A Wimax power amp draws around 1.2W and has a "power added efficiency" of only 10 to 20 per cent, according to Nikkei's Tech-on site (**www.tinyurl.com/ 6ewcd5**). A GSM amp draws a few hundred milliwatts and has an efficiency of up to 55 per cent; a W-CDMA equivalent draws around 1W and is 40 to 45 per cent efficient.

The problem arose with OFDM-based 11a Wifi at 5GHz but was not critical because the required gain was lower, says Tech-on.

The mobile phone industry appears to be settling on LTE technology for 4G data links. The Third Generation Partnership Project, which is finalising LTE specs, has decided against using OFDM for handset transmissions, though it will be used by base stations.

Intel was less bullish about Wimax at Mobile World Congress earlier this year. Its head of sales and marketing, Sean Maloney, said recently that Wimax and LTE should be "harmonised".

Panasonic gets tough with ultra-mobile PCs

Panasonic has launched its first ultra-mobile Toughbook, the CF-U1. It is chunkier than most UMPCs but its 15.1cm x 18.4cm footprint is par for the format and it weighs just 1.06kg. It includes two batteries that Panasonic claims last for nine hours. You can hot-swap spare batteries without powering down.

Solid-state drives (max 32GB) come as standard, as does the magnesium alloy case of earlier Toughbooks, although it is now coated to increase scratch resistance.

It uses a small keyboard with handset-style keys, something I normally hate as I would rather have a good keyboard or none at all – you can always plug one in if necessary.

But the Atom Z520-powered CF-U1 is designed for rough field use, and so should not be judged by consumer standards. Typical uses will involve mapping or e-form filling, with minimal alphanumeric input and often using only one hand to type.

To make two-handed typing easier the Qwerty text keys are split in two and separated by a number pad. The 5.6in 1024 x 600 touch screen can be used for handwritten input, but is too small to do so comfortably. *Clive Akass*

The new Panasonic Toughbook CF-U1 is suited to rough field use

HP heads the field as true-portable sales soar

Ultra-mobile sales increased by an astonishing 3,056 per cent in the year up to March 31, according to figures released by Displaysearch.

The rise was prompted by the launch of the Asus Eee PC, which was followed by me-too products from the likes of HP, Acer, Gigabyte and MCI.

Displaysearch predicts that sales for 2008 will exceed 13 million worldwide, still well short of conventional notebook sales which totalled 31.108million in the first three months this year – and that is counting only those from the top nine vendors.

HP remains market leader, selling 20 per cent more (6.46 million) during the quarter than its nearest rival Dell (4.86 million), with Acer third (4.527 million), followed by Lenovo (3.21 million), Toshiba (2.89 million), Fujitsu Siemens (1.61 million) and Apple (1.433million).

A drift from desktop to laptop formats pushed up notebook sales, with all major vendors except Sony showing double-figure growth. Eee PC vendor Asus saw a 67 per cent sales increase, just ahead of Apple's 61 per cent.

In brief

Mouse doomed

Touch screens and innovative interface devices will kill off the mouse within five years, says a senior Gartner analyst. Steven Prentice told the BBC that devices such as the Wii and the iPhone point to the future. But he believes the keyboard is here to stay as the primary text input device.

Wireless mic

A new wireless device lets you record meetings and make audio notes on your PC from up to 30m away, says Lindy. The £69.99 (inc Vat) Wireless Voice Recorder package consists of a wireless handset, a USB dongle and software. Recordings can be played back either on your PC or on the handset's built-in speaker.

→ **www.lindy.co.uk**

60GB Xbox

Microsoft has tripled the storage of its Xbox 360, with a 60GB version now available for $349, the current price of the 20GB model. This will now sell at $299. "We know that consumers need more space to store the digital content Xbox 360 offers, and we are giving it to them at no extra charge," said Albert Penello, director of Xbox product management. There were no details regarding price or availability for Europe or other regions.

→ **www.pcw.co.uk/2221524**

1.5TB drives

Seagate is to launch its first 1.5TB hard disk for desktops, the Barracuda 7200.11, which uses perpendicular magnetic recording. It will also offer two new 2.5in notebook drives – the Momentus 5400.6 and 7200.4, with capacities up to 500GB, a 3Gbyte/sec Sata interface, shock protection and a free-fall sensor.

→ **www.pcw.co.uk/2221419**

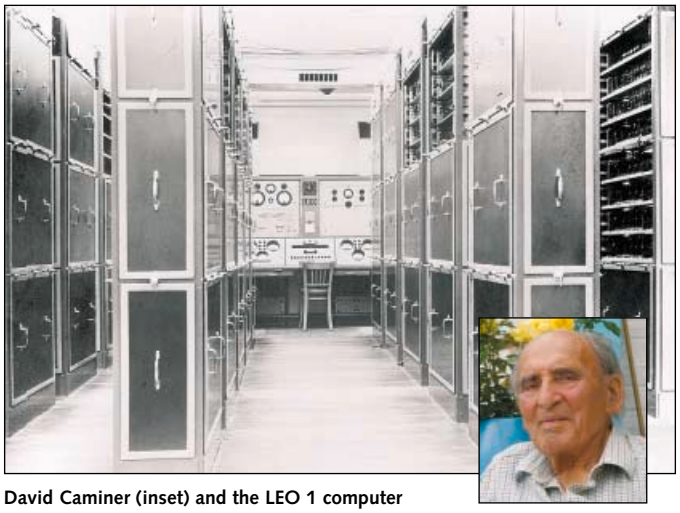
The last roar of the lion of Lyons

The death last month of the world's first systems analyst, David Caminer, revived memories of the Lyons Electronic Office, better known as LEO, the first proper business computer.

It emerged from the heady days immediately after the Second World War, when a bankrupt Britain could spare few resources for the development of new-fangled computers. Lyons Corner Houses were in those days as much a feature of British life as Tesco today. To keep prices affordable, the company had been a pioneer in what was then called scientific management. It quickly spotted the possibilities of computing and partly financed Maurice Wilkes' Edsac computer at Cambridge.

John Pinkerton was deputed to build a version for use by Lyons and Caminer was in charge of developing applications.

Mike Hally recalls in his book, *Electronic Brains* (Granta, £15.99, ISBN 1-86207-663-4), how the first program in 1951 valued all the goods produced at Lyons bakeries.



Photos courtesy Leo Computers Society www.leo-computers.org.uk/

David Caminer (inset) and the LEO 1 computer

It was a relatively simple task that some thought too trivial to computerise, but Caminer felt the team needed experience doing live work on time.

This was the first ever business application and LEO was soon doing everything "from clock-in to payroll". Caminer's team had virtually invented business computing from scratch.

So how was it that the UK got in first? Wilkes generously acknowledged that he owed much to US pioneers, and that earlier US projects took longer because their aim was to produce general-purpose models that could be sold on the open market.

Edsac was built specifically for use by researchers, so it was easier to cut corners. LEO was produced initially for specific purposes within one company, though later models were sold to others.

Lyons was so well known as a caterer and tea merchant that it had a hard time being taken seriously as a computer company, even though it spun its computer operations off as LEO Computers in 1959. After a series of mergers, LEO Computers eventually became part of ICL.

Hally says Caminer was bitter about government short-sightedness, particularly in not granting a contract to calculate the effects of tax changes.

Caminer told him: "We had minimal government support. They simply didn't realise that business computing would become vastly more important in volume than scientific computing. If they could find some scientific computer with time to spare to do the tax tables, then they went there if they were saving a few bob. It was very sad."

Caminer, who was 92, is survived by his wife Jackie and a son and two daughters.

How Sugar fired the enthusiasm of early UK users

It was a sign of the times that the retirement of Sir Alan Sugar as chairman of Amstrad this month was covered by the Press Association's entertainment correspondent. Sugar may be best known as anchor of the hit TV show *The Apprentice*, but he made his greatest impact on Britain more than two decades ago when he introduced much of the population to computers.

Schoolkids in the mid 1980s cut their IT teeth on a Spectrum or a BBC Micro, but adults needed machines designed as work platforms, and as often as not these were Amstrads.

Sugar launched the PCW 8256 word processor for a little over £300, including a printer, in 1985. It was so cheap and so much better than a typewriter, despite a cranky interface, that it seduced even diehard technophobes.

Sugar can be credited with introducing much of the population to computers

A year later Amstrad almost single-handedly turned Britain on to what was then called an 'IBM compatible'. True IBM PCs had been around since 1981, but were too expensive for private purchase.

You could buy an Amstrad PC 1512 plus a printer for well under £1,000, complete with the luxury of a 10MB or 20MB hard disk; cheaper models had only a single 360KB floppy drive. Memory was 512KB, upgradable to 640KB.

The 1512 even had a graphical interface – the Graphical Environment Manager (GEM) from Digital Research – though it was slow and most people resorted to text-based MS-DOS 3.

The hardware was not quite pukka. The monitor (mono or 16-colour) drew its power from the system box and the keyboard used a proprietory connector so you could not swap in standard PC parts. But it set a price benchmark for rival IBM compatibles, which soon became ubiquitous.

The company Sugar founded in 1968, at the age of 21, never again managed to match the impact of these two products.

Amstrad tried in 1993 with the launch of a pen-driven handheld called the PDA600, a few weeks ahead of the Apple's rather better Newton. Both purported to read handwriting, but neither was really up to the task and pen-driven handhelds didn't take off until the Palm Pilot in early 1997.

In 2000 Sugar produced an email-enabled phone called the e-m@iler, but it looked dated even at launch and attracted only a niche market.

Amstrad was bought last year by BSkyB, for whom it had been making set-top-boxes for the last five years.

Sugar is not cutting off entirely from the computer business. He has said he will continue working on his property portfolio, and with Viglen computers, a company Amstrad bought in 1994.

VigorPlug

The 200Mb/s VigorPlug is a device which carries data around your home or office using your mains wiring. It's an ideal and secure alternative to wireless or Ethernet cables.

Vigor 2820 Series

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INTERACTIVE

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LETTERS

Send your letters to The Editor, *PCW*, Incisive Media, 32-34 Broadwick Street, London, W1A 2HG **Send your email to** letters@pcw.co.uk

LETTER OF THE MONTH

LETTER OF THE MONTH

STOP BITING APPLE

I should warn you that what follows are the ravings of a 'Mac fanatic', or 'true believer', or however else you chose this issue to denigrate my chosen brand of zealotry.

I meant to write a few months ago to congratulate you on the excellent 30th Anniversary issue, which really was incredibly enjoyable. However, at the time I was sure it was missing one important piece of history: the true story of what exactly Apple had done to so upset Clive Akass. I'm sure Guy Kewney or someone else could have been induced to tell of the time Steve Jobs stole Clive's lunch money/parking space/girlfriend.

Having just received the September issue, it would appear that Clive's prejudices have spread. Skipping through the news section – pausing only to mention that the iMac predates the iPaq by almost two years – we get to your cover story, which seems to be based on the premise that the only good Mac is a Mac running Windows. This is certainly a by-the-numbers piece on Apple, covering the usual arguments (overpriced and underpowered, accusations of smugness, one-button mouse, etc).

In the feature, Cliff Joseph writes: "However, Apple has spent decades and billions of dollars developing the Mac operating system, so it's not going to sit back and let you replace it with Windows." How very anti-competitive of Apple. Of course, the truth is far less dramatic. Intel Macs, fresh from the box, boot using EFI (Extensible Firmware Interface). This is Intel's successor to the ageing Bios; the piece of embedded software which Windows requires to load. There was a time when *PCW* would have been rubbing its collective hands with glee at the thought of explaining something like this. It would have been given its own box, with acronyms explained, a bit of history and a quick discussion of when it's likely to be coming to the PC. Instead, we get one company's embracing of newer technology portrayed as an attempt to lock out users.

Still, you really showed quite considerable restraint in not taking a cheap shot at the Newton in the same issue's Flashback piece.

Stuart Crook

Clive Akass replies: Believe it or not, I sympathise. Apple does irritate me, and I make a conscious effort to give it credit for its excellent designs. My main defence stems from the zealotry of which you speak: it means Apple gets away with stuff other companies don't.

As an analyst once told me, the industry needs hecklers. This is true of the computer industry, too, especially a company such as Apple, which uses its halo as a weapon. And I'm afraid I have just been criticising Apple again (see page 11 for the full story) over the way Quicktime hijacks Windows.

OFFICE GAMES

Colin Findlay (*PCW*, September 2008, Letters) appears to have purchased the trial version of the Vista game. In the full version, the successful conclusion of the Vista level allows players to proceed to the advanced level – Office 2007.

This brings with it a whole range of exciting new sub-plots, including "Find the menu command" (which can keep players amused for hours on end) and "Spot the bug". The latter is especially exciting because the

inventors have carefully spread a mixture of bugs around that repeat consistently. I found a nice one in Excel called "print selection", which only prints the first six lines of the last page selected. Then there are those that appear almost entirely at random. The one I found lets Word refuse to show text boxes in .doc files written in Office 2003, but it only affects some text boxes, so you never know if they should have been there or not. Sadly, the game has no checklist of clues, and even if you contact the supplier it will keep you guessing!

Office 2007 is not for the faint-hearted gamer. After three months I admitted defeat and decided to restrict my play to the Vista level. Even then, Office 2007 wasn't finished with me, as it decided to port one final game over to Office 2003 – the famous "make the EULA pop up every time I start the programme" game, which can only be completed by editing the registry.

If only these guys at Microsoft could develop real programs that were as clever as their games!

Dave Scott

ILIAD SUCCESS

Having read your review of the Iliad (*PCW*, September 2008) I thought I'd add my view. I bought my iRex Iliad nine months ago for a specific purpose – reading e-books. I currently have 40 books (with room for 10 times as many) on my Iliad which would, in paper form, fill a large rucksack. The Iliad is ideal for reading e-books. Although it takes longer than I would like for it to start up, this is more than offset by the battery's longevity.

Your review complained about the natural colour of the screen reducing the contrast, but as it is about the same as any paperback I can't see how this matters, and you can read it in bright sunlight, even when in partial shadow.

The pen interface isn't a problem as I rarely use it. I do use it for reading PDF manuals, but even then a couple of pen strokes are enough to position the page into the most readable format.

The iRex Iliad is an alternative way to read books

The Iliad is primarily designed as an e-book reader and, as such, is near ideal. I look forward to being able to buy a reader with colour e-paper in a year or so.

Ian Powell

LISTEN HERE

Kelvyn Taylor's request (*PCW*, August 2008) for readers' experiences using mini PCs brought out the sense of exasperation that I'm sure many consumers feel about IT products and how they are marketed.

I've had an Asus Eee PC for over six months and can't fault it. It's portable, reliable and conforms to the 90/10 rule. It does most of what I want to do, and does it well. I've fiddled about with the full desktop and added and changed applications, but I've gone back to the Noddy-style interface and the common applications because these meet my day-to-day needs. If I want sheer horsepower or sophisticated applications, I use my PC.

This experience, and hence the demand for such devices, seems to have astonished the industry. Why? Because they don't listen to, or consult, their customers when developing new products and services. They spend lots of time and money trying to anticipate what we will buy, and devising new, eye-catching features rather than real benefits. Marge Simpson's frying pan with built-in FM radio is a perfect example! Just because you can, doesn't mean you should!

David Oliver

WHY SPY?

It saddens me to hear that Virgin Media is writing to broadband customers it suspects of downloading music illegally. In doing this, Virgin Media is telling customers it distrusts them. This prompts me to ask: is it the ISP's responsibility to monitor its customers' online activities?

What next? If you walk into a shop, are you going to be confronted by security guards warning they suspect you might be shoplifting, simply because you are carrying a large bag? Will bus and train companies (including Virgin!) be warning passengers they suspect some of them might be carrying illegally obtained items and, if so, will they be thrown off and banned? Maybe the phone companies will include a note in their bills telling customers who have called a relative in a particular country that they are suspected terrorists.

The same news report had someone from the Performing Rights Society announce that he thought ISPs should be held responsible for monitoring the activities of their customers. Perhaps then Virgin Media should be held responsible for all the scam emails it has delivered to me telling me I have won the European lottery, or that I can have £30m by helping some poor Nigerian diplomat get his money out of his country. In fact, I think Virgin Media is opening itself up to lawsuits from individuals who have lost money through these email scams; after all, Virgin is admitting that it is, in part, responsible for the content that passes through its servers.

Virgin Media should employ more people to man tech support lines rather than employ more people to snoop on customers who may, or may not, be downloading copyright material.

Ron O'Brien

THE HASSLE-OFF

Gordon Laing (*PCW*, September 2008) could have saved himself a lot of time and trouble crawling around on his hands and knees by adding a network extender.

Having a three-storey house with lots of steelwork meant my wireless network on the top floor was not reaching the ground floor, so I fitted a Hawking wireless extender in under 10 minutes at a cost of £54.

Plugging a cable from the extender to my desktop it found my original signal, plus the other five signals from my neighbours, and a couple of minutes setting up the SSID completed the work. Now the extender sits downstairs giving me a signal level that has allowed me to type this on my laptop in the conservatory with a wireless signal of "Excellent".

Sometimes, the simplest options are the best!

Gerald Barnett

WIN Next month's prize for the letter of the month is a Ricoh GX 2500 Gelsprinter

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Gordon Laing

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Striking a sound balance

Attempting to create accessible music files without compromising on sound quality isn't always easy

When it comes to technology, high performance and convenience rarely go hand in hand. If you demand the best of one, there'll inevitably be compromise with the other. Regular readers of *PCW* know I'm a performance nut who'll eschew convenience in my own search for perfection, but over the past few years I've been trying to strike a balance for one particular obsession: audio.

I'm what fellow enthusiasts would call an audiophile. I'm the guy with the huge loudspeakers, hefty amplifiers and esoteric cabling occupying a large portion of the living room.

However, I've always envied PC-based digital music collections. Shelves free of media and having instant access to your entire collection, complete with track and artist details. The challenge is achieving it without compromising sound quality.

'I discovered a number of people who had souped-up their Squeezeboxes'

My goal is to have the convenience of a PC-based digital library, but with the audio quality of my existing Meridian 500 CD transport. Long-term *PCW* readers may remember an earlier column where I began this process by evaluating different audio formats. Update: I ended up going with Flac ripped with Exact Audio Copy.

The next question was what to play them on. I ruled-out connecting a PC direct to the hi-fi as I've never found a satisfactory solution for navigating an audio library or remote controlling it without a monitor. There are some neat PDA-style remotes, but I wanted something simpler. Something like a Slim Devices Squeezebox 3, but with better quality audio.

I've spent ages comparing different streaming appliances, only to keep coming back to the Squeezebox 3. I believe Slim Devices got the interface and server software spot-on.

When connected to a high-end digital to analogue converter, the quality from a standard Squeezebox 3 is already good. But it's still flat and uninvolving compared to a decent CD transport, so what are your options for improving things?

Slim Devices offers a high-end streaming audio appliance called The Transporter, but a large portion of its budget is devoted to the analogue side of things. This would be redundant in my system as I'd be using a digital link. On the Slim Devices forums though I discovered a number of people who had souped-up their Squeezeboxes.

The first step is to improve the actual digital path within the Squeezebox itself. Colorado-based Bolder Cable (**www.boldercables.com**) offers a variety of modifications. I opted for its Squeezebox 3 'Digital Only Mods' costing around £125, which upgraded the internal power supplies and re-routed the digital output circuit for a cleaner signal. You'll need to send your Squeezebox to them or order a new one and have it delivered there first.

The second part of the equation is to upgrade the basic power adapter which comes with the Squeezebox. Bolder Cable offers a number of modifications to third party power supplies along with its own 'Ultimate power supply', although the latter was a hefty £500-£900 depending on the configuration. Instead I opted for the VDC-SB power supply from Channel Islands Audio (**www.ciaudio.com**, also in the USA), costing around £140 and available with a 240V input.

The total cost of modifications and shipping came to a pretty reasonable £300 and the result was a big improvement over an unmodified Squeezebox with a standard power supply. In typical hi-fi terminology, the soundstage had greater depth, detail and cleaner, better imaging. In normal speak, it simply sounded much better. That said, the CD transport still had the edge, ultimately sounding more dynamic and involving.

Crucially though the modified Squeezebox 3 now sounded sufficiently good for its convenience to outweigh the CD transport for day-to-day listening or social occasions. The process also made me really appreciate my existing CD transport and rediscover serious listening with it.

So while I haven't achieved my original goal and retired my CDs, I feel I've got the best of both worlds, or at least an acceptable compromise. I can certainly highly recommend modified Squeezeboxes to audiophiles in a similar position. So is my search now over? For now maybe, but I am intrigued by that high-end power supply. **PCW**

Barry Fox

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No place like home entertainment

A lack of loyal customers may hamper Microsoft's charge into the booming media player and pocket PC market

Microsoft-bashing is boring. So let's just say that – as happened a decade ago with arrogant IBM and smug Kodak – Microsoft looks overdue for a reality check. Microsoft seldom, if ever, now holds press events at which senior policy makers talk turkey. But during an industry conference on digital TV and home entertainment, held by consumer electronics trade body Intellect, Microsoft's UK MD Gordon Frazer came down from the mountain to give a speech about the advantages of networking PCs and servers round the house.

It's the same line we have been repeatedly spun since Microsoft started promoting a networked Windows Media Center as the replacement for standalone boxes.

There is of course never any mention of those error messages that helpfully announce 'Network not available... Contact the Administrator...', even though the network worked yesterday and you are your Administrator.

'The success of the Asus Eee PC has finally brought Linux out of the shadows'

Frazer's speech was mostly inconsequential but the audience woke from a doze when he threw in the sniping aside: "I am not going to mention the maker's name but my set-top box is the most unreliable piece of electronics in my home."

Frazer had left the house and gone back up the Microsoft mountain before the Q&A session. I – and some STB manufacturers – had wanted to ask him a few basics; had he tried another box with the same antenna, checked that his box had the latest firmware, and re-scanned the channel list?

It's a shame Mr Frazer didn't stay for the Q&A. He would have heard Dave Tansley of market analysts Deloitte answer a question on whether independent research showed any success for the Windows Media Center PC.

"I have no figures" said Tansley, "But I do have an observation. The level of reliability of IT equipment is profoundly different from the level of reliability the consumer electronics industry will tolerate. You can't just cut and paste IT technology into the living room.

"If you want to see a grown man crying I'll show you my work colleague who transferred all his music to a Media Center and took the CDs to a jumble sale. Then the hard disc crashed and he lost everything."

The success of the Asus Eee PC has finally brought Linux out of the shadows. It's no longer just the operating system manufacturers hide inside set-top boxes or Open System community devices like the Neuros MPEG4 capture box. It's now a working tool that works well, and has helped force Microsoft into reprieving XP.

Microsoft is now facing a new threat. Pocket portables finally have screens good enough to make watching a video a pleasant experience rather than an endurance test. Portable play is a huge new market opportunity. The Symbian operating system is already in 200 million pocket devices, with a royalty rate of between $2.50 and $5 per unit. Microsoft charges two or three times as much per Windows Mobile device. Now Nokia plans to "do a Linux" with Symbian.

"It's an unprecedented move," Kai Oistamo, Nokia's executive vide-president, said at a press briefing arranged when the company tied up the deal. "Ten years ago Symbian Ltd was set up to licence the Symbian operating system. Seven device manufacturers and 250 network operators are using Symbian. Now we are going to make it an open platform and give it away free."

Nokia is paying €264m to buy out the other partners (including Sony Ericsson, Panasonic, Samsung and Siemens). The independent non-profit Symbian Foundation will control royalty-free licensing. Nokia thinks it will recoup the money from increased mobile hardware sales. The implications for Microsoft are clear.

Nokia's move puts Apple and the iPhone under attack too. But there is one big difference. Apple-users are fiercely loyal to Apple and Steve Jobs. They will even pay the £6 which Apple charges for iPod Touch software upgrades.

People with Windows PCs are fed up of 'lost' USB ports, broken networks and endless critical reboots. They have no allegiance to Microsoft, Bill Gates or Steve Ballmer. Just the opposite in fact. When the time is right they will happily switch to Linux and Symbian. **PCW**

Guy Kewney

guykewney@gmail.com

PCs for the style-conscious

Apple's position as the third-largest PC supplier means the time is right for the 'Ultimate Walnut PC'

I can't resist any longer. It's clearly time: the world needs my invention, and it would be negligent – no, cruel! – to deprive humanity of the 'Ultimate Walnut PC' any longer.

The realisation that the time for style over substance has arrived, comes with the discovery that Apple is now the third-largest supplier of personal computers – in America, at least. And honestly, I can't argue the Mac isn't worth the effort (and the extra cost) compared with buying a Windows box; it has, clearly, got many advantages over the top-heavy system which, like Marley's ghost, carries all the mistakes of its past along with it, chained to its legs.

What I can argue with, is the horde of Mac-worshippers who wouldn't know the difference between a clean system and a bloated one – and wouldn't care, as long as it looked stylish.

'I can't argue the Mac isn't worth the effort compared with buying a Windows box'

The first time I saw a pitch-pine case for a computer, it was a commercial venture by a guy who had discovered a huge store of this heavy, almost unfloatable timber; and was using it for music mixing consoles. The musicians he sold to were delighted to get luxury-looking studios; the need for acres of switches and matt-black consoles and brushed aluminium knobs, offended their sense of design quality, and they paid him substantial sums to make their operating rooms look like old-fashioned stately home libraries.

He asked my opinion of a prototype Apple II in a wooden box. I explained, politely enough, that the whole point of a personal computer was that it was cheaper than an office minicomputer; if you added £500 to the price people would expect it to run twice as fast, or have four times the storage. The varnish – I predicted – would impress nobody. And indeed, that proved to be the case.

In those days, as I've reminded readers more than once before today, a three-month-old design was virtually obsolete. That's why computers were reviewed before they actually worked. We'd get the prototype boxes, tell the makers what went wrong, and they'd hope they could live up to the promise "will be fixed before it's available in the shops". And generally, they could.

Today's hardware, whether Mac, Windows, Linux or some real-time operating package for system management runs on it, really isn't so perishable.

You can design something around a quad-core Xeon or Spider, and spend time making the box shinier, the keyboard nicer, and getting drivers for the hi-fi audio card working, and delay the launch by six months – and get approval from the market. Twenty years ago, you'd miss the market. And style, once irrelevant, now counts for more than performance for all except the most hardcore gamers.

I can't complain, of course; I recently updated my 64-bit Athlon box (dual-core) to the top of the range Spider. It not only runs Half Life and sequels with the smoothness of a cinema production: it also looks like something off the set of Batman. Blue lights keep the neighbours awake, and all that hot silicon keeps my office nice and warm in cold weather. Smart kids visit and say "Wow!" as if they mean it. Then they notice my antique Thinkvision flat-panel display, and realise they've been done; I'm a phoney. I don't have class, no style at all.

Walnut is the cure, I'm sure. I'll set up **www.walnutpc.com** in a moment, and start taking orders. And when, one day next year, it becomes out of date (because of the third-rate electronics components used) you'll just pull the motherboard out, and stuff a new one in.

The hand-carved logo (a hunky mouse) which adorns the side of the box will probably mean that in 50 years from now, antique Walnut PCs will fetch five times what they do today. And collectors will say: "Of course, when they first shipped, these cases used to have electronics inside them, you know? But they look much better as drinks cabinets, I think."

As to whether they ran Linux or Leopard, well; that will be one of those esoteric questions which students of arcane trivia will use to amaze the ignorant. Send your Paypal details or credit card security code to me right away, and be first in your neighbourhood to own one of these covetable, future antique collectors' items! **PCW**

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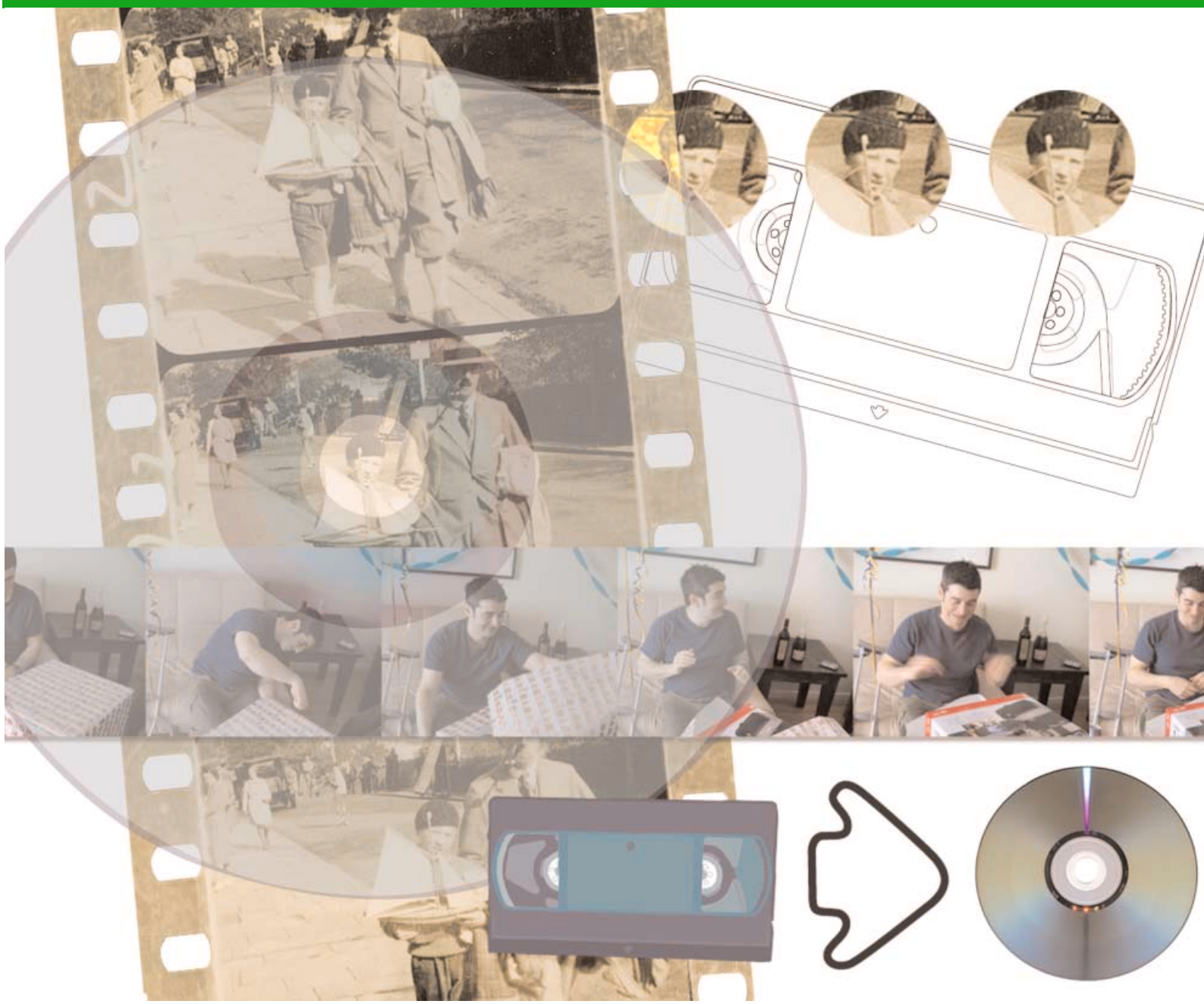


Convert VHS to DVD

Don't let your old VHS tapes rot away in your loft – use the latest technology to preserve them, says Ken McMahon

Consumer digital video has been with us, in one form or another, for more than a decade. If you still own a VHS VCR, it's more likely to be gathering dust in the attic than sitting on the shelf underneath your TV. Analogue video hardware is no longer just stuff you don't use any more, it's becoming history and will soon be as relevant to home movie making as celluloid film.

More and more people are waking up to the fact that, if they ever want to see their old VHS analogue recordings again, they are going to need to drag them into the 21st century. In other words, transfer them from magnetic tape to DVD or even Blu-ray discs.

If you've been putting off converting your old VHS tapes, now's the time to do it. Capture devices that connect your VCR or camcorder to your PC are cheaper than ever and, for those whose VCR has long gone, machines such as the new Ion VCR 2 PC from Firebox.com provide everything you need in one box with one cable. Alternatively, you can take the easy route and pay someone else to do it for you.

Whichever route you take, our VHS conversion guide will show you how to overcome the technical pitfalls and get the best quality results so you can continue to enjoy your old movies for years to come. ↘

CAPTURE EQUIPMENT & TECHNIQUES

The first step in converting your old analogue video to digital media involves capturing the footage. Three things are required for this – a player, a digitiser to convert the analogue signal from the player to digital video that you can work with on your PC and some software to handle the capture process, (the same software can usually also be used to edit the captured footage and burn it to disc).

PLAYBACK HARDWARE

The player could be anything from the original camcorder you shot the footage with, to a domestic VCR. Digitiser options are also many and varied, but the end result is invariably the same – digital video encoded in a standard format such as MPEG2 (the format used for DVD video).

We'll take a look at digitising hardware and video codecs a little later on page 33, but first let's take a look at the hardware you can use to play back your tape for capture.

Camcorders

Most consumer analogue compact camcorders popular in the 1980s captured video in one of two analogue formats recorded onto 8mm tape cassettes – Video8 and VHS-C. There were also two higher quality, or hi-band, variants called Hi8 and S-VHS-C.

If your VCR only has a Scart socket, you'll need an inexpensive adapter to connect it to your capture hardware

If you own one of these higher quality camcorders, to get the best-quality captures you will need to connect it to your capture device using an S-video cable. This has a small, round mini-DIN connector at either end with four pins. You will find an S-video out port on the camcorder and you will also need a capture device with an S-video input port.

The S-video cable doesn't provide an audio link, so in addition you will need to connect the audio output on the camcorder to the input on your capture device – the capture device's instructions will tell you how to do this.

To connect Video8 and VHS-C camcorders you'll need to use a composite-video connector. One of these should have been supplied with your camcorder. They sometimes have a small jack plug at one end which plugs into a port – usually labelled AV – on the camcorder and three coloured RCA phono plugs on the other end. The yellow one is the composite video, the red and white ones are the right and left stereo audio channels.

The generation game

One of the biggest problems that digital video eliminated was that of generational loss. In the pre-digital days, editing analogue footage necessitated copying it from the camcorder tape to an editing master tape. Then, if you wanted to give copies of the edited tape to friends and family, a further copy would need to be made from the master. With each copy, the image quality noticeably degraded. If you want to get the best-quality results when digitising old analogue tapes, wherever possible try and use the original footage from the camcorder.

VCRs

Using a VCR as a playback device involves making the same connections as for a camcorder – one for the video and one for each of the stereo audio channels, but VCR outputs are not the same as those on a camcorder and vary from model to model.

If your VCR has composite video and stereo audio outputs you are in luck, all you will need to connect it to your capture device is three cables with RCA plugs at either end, colour coded yellow for video, red and white for audio.

If it's an inexpensive model, your VCR will probably have only one or more Scart sockets for connecting to a TV. If that's the case you can get an adapter for around £10 that plugs into the Scart socket and has the necessary RCA connectors on the back (see **www.tvcables.co. uk/cgi-bin/tvcables/SC300.html** for an example). Some capture packages, such as Magix Rescue Your Videotapes, come with such an adapter included in the box.

CAPTURE HARDWARE

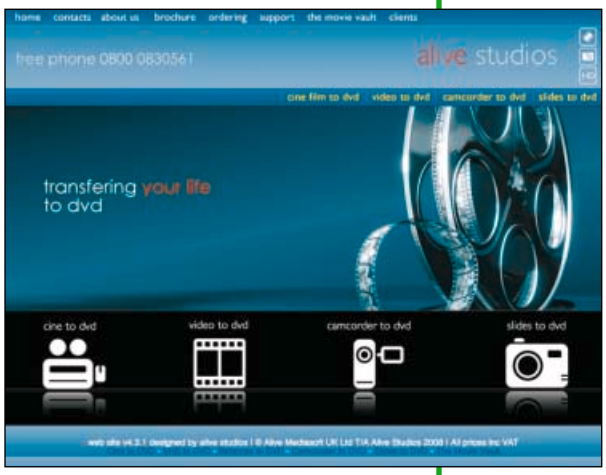
It seems suddenly people have realised their old analogue video tapes won't last forever, and the market has responded with a variety of inexpensive, easy-to-use hardware capture devices. These range from small USB boxes to devices such as the Firebox Ion VCR 2 PC

Commercial conversion services

If you don't fancy the DIY route, there's no shortage of companies offering to transfer your VHS tapes to DVD for you. These companies are conversion specialists and can work with most video formats as well as cine film, so if you have material in a variety of formats, this is a good way to get it all converted. If you're worried about losing all your precious memories in the post, some companies will send the you the transferred material on DVD first and hold on to the originals until you've received them.

Costs for transferring from VHS tapes to DVD are usually charged per hour of footage and range from £5 to £30. The wide price variation reflects the quality of the service provided. At the bottom end of the range your footage is simply digitised as is, MPEG2 encoded and burned onto a basic DVD. The better and more expensive services will employ time base correction to produce a clean signal, apply colour-correction filters to the captured footage, enhance the audio and remove tape hiss and other noise and even manually edit out blank sections.

You can also pay for additional services such as themed custom DVD menus, titling and backing music.



Some companies offer video transfer services

Below is a selection of websites in the UK offering such services.

www.alivestudios-memories.co.uk/
www.fotostation.co.uk/Video-to-DVD-convert-copy—transfer.asp
www.videostudio.co.uk/efvcddvd.htm
www.transfervideo.co.uk/

The Ion VCR 2 PC from Firebox.com is a USB VHS VCR with integrated capture hardware

(see our review on page 68). These are described in more detail in the next section, but it may be that you already have the necessary hardware to digitise your analogue tapes and store them on your PC ready for burning to DVD. We will now look at the most common options for capturing.

DV camcorders

If you have one, your DV camcorder is, of course, a digitising device and has everything necessary to convert analogue video signals into digital video. The problem is that many camcorders lack an analogue input port to let you connect them to your playback device. Canon, JVC, Panasonic and Sony all produced DV camcorders with analogue-in ports, so if you own a DV camcorder made by one of these companies it is worth checking whether it has this functionality.

A digital camcorder will convert analogue video using the DV codec, producing high-quality PAL resolution (720x576) video. If the DV camcorder has a 'pass through' facility you can connect it to your PC using a Firewire cable and capture analogue video from a connected camcorder or VCR directly. If it doesn't you will first need to record the analogue video to a DV tape in the camcorder, then capture it to your PC and edit in the same way as other footage shot with the DV camcorder.

Many VHS-C camcorders came with an adaptor like this one which allows you to play the compact tapes in a VHS VCR

USB capture devices

USB capture boxes (see box on page 34 for a selection) provide a cheap and convenient way to digitise your analogue tapes. They plug into a spare USB port (make sure it's a USB2 port, as USB1.1 is far too slow) and the simplest ones provide composite video and stereo audio inputs. Models with an S-video port cost a little extra, but it's well worth it if you have material shot on a hi-band camcorder.

These boxes convert the analogue video to an intermediate digital format, which is then encoded using the settings specified in the video capture software that's bundled with them. When choosing a USB capture device your choice may be influenced as much, if not more so, by the capture and editing software as the hardware.

If you don't already own a video editing and DVD burning program, buying a USB capture device is a good way of getting these as it's often no more expensive than buying the software on its own. You don't have to use the software provided, though, as you can use the capture module of your preferred video-editing application – just specify the USB capture box as your video source in the relevant menu.

Rescue Your Videotapes from Magix (£59.99 at **www.magix.com/uk/rescue-your-videotapes/detail/pr/**) provides a comprehensive hardware kit consisting of the USB box itself – more like a USB stick and about the size of a Wifi dongle, with composite video, stereo audio and S-video connectors hanging off the back, plus a separate Scart adapter. It comes with a full version of Magix Movies on DVD 7 which has everything you need to capture, edit and write your analogue footage to DVD.

Pinnacle Systems' Dazzle Video creator (£69.99 at **www.tinyurl.com/5oe2c9**) is a more substantial and attractive piece of hardware that has the same inputs as the Magix stick. The Platinum version ships with a software CD that includes a full version of Pinnacle Studio 11, Pinnacle Instant DVD recorder, Volumes 1 and 2 of a royalty-free music library called Scorefitter and a disc of bonus material.

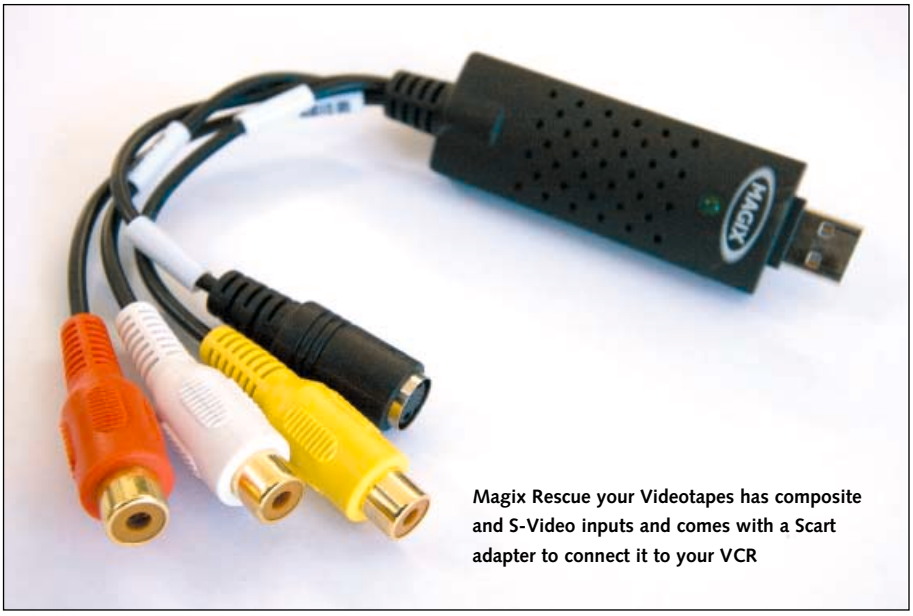
If you no longer have your analogue camcorder and don't own a VCR, the Ion VCR 2 PC from Firebox (£149.99 at **www.firebox.com/product/2108/USB-VHS-Converter**) could be just what you need. It looks like an inexpensive VCR and, essentially, that's what it is, but the VCR is fitted with an integrated capture device that automatically captures the analogue video from the inserted VHS tape and sends the output via a USB port.

'It seems people have realised old analogue tapes won't last forever'

All you need to do is install the software, connect the VCR 2 PC to your PC using the supplied USB cable, pop in a tape and press play. But while the hardware is simple and straightforward, the Arcsoft capture software is a bit of a chore to work with and the interface is horrible.

Mercifully, you only have to go through the setup routine once, to tell the software where to store the digitised video files and choose a quality setting. On the highest quality the VCR 2 PC produces PAL resolution MPEG2 video files suitable for recording to a DVD. The software can do this ↘

Newer camcorders can connect to capture devices via S-video connection



Magix Rescue your Videotapes has composite and S-Video inputs and comes with a Scart adapter to connect it to your VCR

for you, but if you have an alternative DVD authoring program, you're almost certainly better off using it.

EDITING & RESTORING

If you're used to watching DV-quality home video, seeing VHS video can be a bit of a shock. Compared with DV, the quality is, let's not mince words, rubbish. Image definition is poor and colour can range from pale, desaturated hues to fuzzy, bleeding splodges of primary pigment.

The first rule of restoration is to give yourself as little to do as possible. That means providing yourself with the best-possible-quality footage to begin with, so if you can use original footage – the original tape from the camera, and use the correct leads (i.e. S-video for hi-band material).

If you haven't used your VCR for a while, run a head-cleaning tape through it a couple of times and adjust the tracking to get the best-quality playback. If the image jumps or is badly distorted, you'll need to beg, borrow, or buy a Time Base Corrector, or get a commercial service to transfer the footage for you (see the boxout on page 30 for more information).

Finally, capture your video using the best-quality settings for the codec you are using. If the captured digital video does not look as good as your analogue original, either you have made the wrong choice of codec, or the bitrate is set too low.

See the next section to find out what capture codec to use and how to choose the right bitrate setting.

Once your footage is captured there is quite a lot you can do to improve the overall quality and fix any specific problems. The editing tools provided in your video-editing application can get you a long way and there are also some specialised tools that can help.

To improve colour reproduction, look for colour correction and balancing tools. In budget video editors, these are likely to be restricted to automatic colour-correction filters and possibly a hue/saturation control. For more advanced colour-correction tools, including graphical readouts that can help you stay within safe saturation limits for trouble-free display on a TV, you will need to look to more advanced editing applications such as Adobe Premiere Pro and Sony Vegas.

If you're on a tight budget and can't afford professional video editing tools then take a look at the Virtualdub video processing

There are many video-editing tools available online that can improve the quality of your footage

Time base correctors

Many of the problems that are associated with poor VHS quality are due to mechanical differences that make it impossible to play back the video signal from the VHS tape in the same way that it was recorded. These differences, called time-base errors, result in vertical frame rolling, horizontal frame displacement, jittering, alternate lightening and darkening of the image and wavy vertical lines. Time-base errors will be apparent before capture as playback quality viewed on your TV will be poor – you'll see these problems if you attempt to play back your tapes on a VCR connected to your TV.

They can be eliminated using a Time Base Corrector (TBC). If you own a good quality S-VHS VCR it may have a built-in TBC – all you need to do is switch it on. Though the cost of standalone TBCs is reducing, budget models still cost around £200, so aren't really worth investing in unless you have a lot of VHS material that suffers from time base errors.

One option is to send your tapes to a professional conversion service, the equipment they use will include TBCs. Alternatively, if you're in the market for conversion hardware you could take a look at the Canopus ADVC 300 which features built-in time base correction. The ADVC 300 works in a similar fashion to the Magix dongle, taking the input analogue video and digitising it (in DV format) before sending it to your PC, but has a much higher specification including composite and S-Video compatibility and a Firewire connection to your PC. It also incorporates high-quality video enhancement filters and other features specifically aimed at digitising VHS content. It costs £294 from **www.cancomuk.com/Business/Creative/Video/Digital-Video-Converters/Canopus**

The Canopus ADVC 300 is a professional-quality video converter with built-in time base correction

utility (**www.virtualdub.org**). While it lacks the usability and interface niceties of commercial software, Virtualdub is free and a number of people have written plug-ins and filters aimed specifically at dealing with the kinds of quality problems that occur with analogue capture. Good places to look for Virtualdub filters are Dmitry Popov's website (**www.thedeemon.com**) and Donald Graft's website at **http://neuron2.net**.

If you are working from a copied VHS tape then colour bleed will almost certainly be a problem. Colour bleed results in strong colours – usually reds – smearing and 'bleeding' into surrounding detail. Reducing the colour saturation can alleviate bleeding to an extent. Virtualdub filters that you can use to remedy colour problems include Sergey Stolyarevskiy's Automatic White Balance (**http://acobw.narod.ru/acobw.html**), Yudong Yang's Image Processing plug-in (**http://pcvideo.tripod.com/download.htm**) and RGB equalizer (**http://fdump.narod.ru/equalizer.htm**) by Eugene Khoroshavin.

Another big issue with VHS conversions is noise. Noise is a bit of a catchall term that covers pretty much any degradation in video image quality due to poor signal quality. Noise looks like spots or grain, bright coloured dots and horizontal lines.

One of the best tools for dealing with video noise is the free plug-in Video Denoise (**www.risingresearch.com/en/denoise/index.shtml**). The plug-in is available for Adobe Premiere as well as Virtualdub.

Noise is also, of course, a problem that affects audio. With older analogue camcorders, tape hiss and motor noise are likely to be a problem. These days, most budget video editors provide at least one audio noise-cancelling filter, but their effectiveness in dealing with these kinds of problems will be limited. Often the best solution is to export the audio and filter it in a dedicated audio processing application such as the open source audio editor Audacity (**http://audacity.sourceforge.net**).

Alternatively, if your video-editing application supports VST audio effect plug-ins there is a wide variety of low cost and free plug-ins that can help reduce recording noise. One commonly used technique that can be effective for wind, aircraft, motor and tape noise and tape hiss is to filter out these frequencies using a low-pass audio filter.

ENCODING AND BURNING

Once you have captured, digitised and cleaned up your recordings, the archiving side of the process is complete.

In this section we'll look at the details of creating DVDs for playback, but first we're going to look at one of the things that cause grief for most people – codecs.

Codecs

Possibly the most frequently asked question in video capture is "What's a codec?", usually followed by "which codec should I use?" A codec is a program (it can be a piece of software you install on a PC or a function embedded in a silicon chip) that encodes and decodes digital data – in this case video.

A major function of video codecs is to compress (and decompress) the vast quantities of data in a video stream. As the name implies a codec has two functions, and video that has been encoded with a specific codec – for example, video encoded as MPEG2 requires an MPEG2 codec in order to play it back.

One of the confusing things about codecs is that there are so many of them. In the early days of digital video, many proprietary codecs were developed for different applications such as video editing, broadcasting, or video conferencing. Modern codecs are more versatile and can encode at a variety of bitrates and compression settings, providing output suitable for all kinds of applications.

To capture analogue video and record to DVD-Video discs you really only need one codec – MPEG2. The advantage of capturing in MPEG2 format is that there's no need to transcode (convert from one type of encoding to another) the captured files before writing them to DVD – they're already in DVDs standard MPEG2 format. But editing MPEG2 video places a high burden on your CPU and graphics chip so, if your PC is on the old or slow side, or you want to edit your captured footage in with more recent video shot on DV, encode it using the DV codec.

'A codec is a program that encodes and decodes digital data'

Then when it comes to burning your project to a DVD you can transcode the footage to MPEG2, choosing bitrate and compression settings that guarantee the best quality given the length of the movie and the available disc space.

If you plan to do other things with your movies, such as email them, play them on a handheld device, or upload them to a web page, you might want to investigate other codecs such as DivX, H264, and WMV (Windows Media Video).

Pinnacle's Dazzle Video Creator Platinum comes with Pinnacle Studio 11 in the box

See the boxout on page 35 for more information on these and other codecs.

Another issue that often confuses those new to video editing is where AVI and MOV (Quicktime) file formats fit in. The crucial thing to understand is that AVI and MOV are not codecs, but video container formats developed by Microsoft and Apple respectively.

It's possible to produce an AVI or MOV file using a variety of codecs. A video file may have a filename like video.avi or video.mov, but the contents may be encoded in MPEG2 or any other format supported by the container format. When you capture footage from a DV camcorder, for example, the files are saved as .avi files encoded using the DV codec.

Bitrates and compression

Codecs such as MPEG2, H264, DivX and WMV provide a variety of compression and quality options that can be set to produce files of a given size or quality.

These settings are provided to squeeze the best possible quality from video within the storage size, or bandwidth constraints of the output medium, be it a DVD, a memory card, or a web server.

Knowing how the encoding options will affect the resulting file size and quality can help you get the best possible image quality whilst keeping file sizes small and maximising the amount of footage you can fit on a disc.

The DVD-Video standard uses MPEG2 video. The three MPEG2 parameters that have the biggest effect on file size are resolution, frame rate and video bitrate. For PAL DVD-Video, the frame rate is fixed at 25fps (frames per second) and, although you can reduce the resolution to 352x288 pixels, this has such a detrimental effect on quality it's not recommended.

That leaves the bitrate. Depending on your MPEG2 encoder, various options will be available here, but before we look at them in detail consider this. The maximum MPEG2 bitrate for DVD is 9.8Mbits/sec including audio and subtitles. At this bitrate you can easily fit more than one hour of video on a single-layer DVD disc.

So, if you have less than an hour's worth of material, set your encoding parameters to the maximum quality constant bitrate setting – you have got nothing to lose in terms of disc space and this will guarantee the best quality.

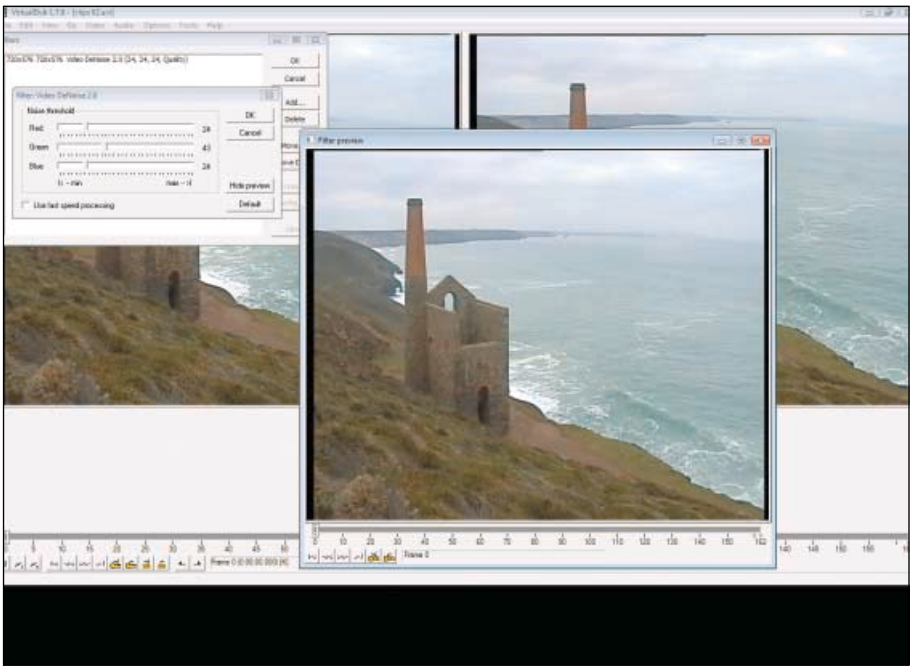
What if you want to fit more than an hour's worth of material on a single-layer DVD and still maintain the best possible quality? The most obvious option is to reduce the bitrate. There's a simple arithmetic correlation – if you halve the bitrate to around 4Mbits/sec you'll get two hours on a single-layer DVD.

If your encoder supports variable bitrate (VBR) encoding, you can achieve better quality output than with constant bitrate (CBR) encoding at equivalent file sizes. VBR encoding allocates higher bitrates to complex scenes that don't compress well, (for example, scenes with a lot of movement or complicated transitions) and lower bitrates to simple, relatively static sections of footage to maintain the best overall quality.

With VBR encoding you set the average, maximum and minimum bitrates. With an average bitrate of 4Mbits/sec you should be able to fit two hours of video on a single-layer DVD and achieve a better quality result than with 4Mbits/sec CBR encoding.

The more sophisticated MPEG2 encoders provide the option of dual-pass encoding. This takes longer than single-pass encoding, but produces even better quality results.

MPEG2 encoders usually provide an estimate of the disc space your footage will occupy at your selected encoding settings. Alternatively, there are numerous online bit rate calculators available (see **http://dvd-hq.info/bitrate_calculator.php** for an example).



Video Denoise for Virtualdub is one of the best noise removal filters around – and it's free

What you'll need to get started

Here's a summary of the converter products we've mentioned in this feature, plus some alternative USB converter boxes you might like to investigate.

Magix Rescue your Videotapes
www.magix.com/uk/rescue-your-videotapes/detail/pr/
£59.99

Dazzle Video Creator Platinum
www.pinnaclesys.com
£69.99

Pinnacle Video Transfer
www.pinnaclesys.com
£99.99

Terratec Grabster AV150MX
www.terratec.net/en/products/Grabster_AV_150_MX_2248.html
€59.99 (around £48)

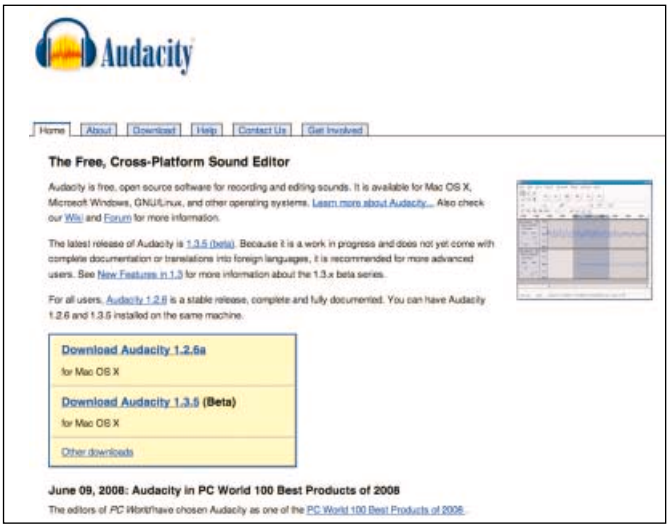
Terratec Grabster AV250MX
www.terratec.net/en/products/Grabster_AV_250_MX_2348.html
€99.99 (around £80)

ADS DVD Xpress DX2
www.adstech.com
£72.78

Ion VCR 2 PC
www.firebox.com/product/2108/USB-VHS-Converter
£149.95

Canopus ADVC 300
www.cancomuk.com/Business/Creative/Video/Digital-Video-Converters/Canopus
£293.74

Virtualdub
www.virtualdub.org
Free



Audacity is a free program that offers many ways to manipulate audio recordings

One final thing to consider is that best-quality DVD encoding is, in one sense, overkill for VHS quality material. Even for good quality source footage, say from a master tape shot in a hi-band camcorder and captured using a S-video cable, you're very unlikely to see any quality loss in an MPEG2 file encoded at 4Mbits/sec.

Burning to disc

Having captured and edited your footage and decided how you're going to encode it, the only thing left to do is burn it to a disc. Video disc burning software may offer the option of VCD (Video CD), SVCD (Super Video CD), DVD or BD (Blu-ray Disc). VCD and SVCD are designed for storing video on CD-Rom. Although many domestic DVD players will play VCDs and SVCDs, the low cost of DVD burners and media has rendered the format more or less redundant.

'Blu-ray burners and media are expensive but falling in cost'

As in the early days of DVD, Blu-ray burners and media are expensive but falling in cost – a recordable Blu-ray disc costs around £5 from Amazon, and a burner such as the LG BE06LU10 external writer will set you back £220. Internal models start at around £170.

There's no quality advantage in burning to Blu-ray discs: using a Blu-ray HD codec for VHS-quality material would be pointless, but the 25GB capacity of a single-layer disc and backwards-compatibility (BD players can also playback MPEG2 encoded video) means you can fit more than five times as much video on a Blu-ray disc as you'd get on a single-layer DVD at the same quality.

One other thing you need to think about prior to burning your disc is how easy it will be to find the clip you want on a disc containing several hours of video.

Unless you create a DVD chapter menu, finding your favourite bits will be as tedious as in the days when you had to search through a tape using the fast forward and rewind buttons.

Most video-editing and burning applications will automatically produce a menu for you, creating menu buttons for clips everywhere there is a cut in the timeline. You can usually also define automatic chapter points at set time intervals so that you get a scene selection button every five minutes, for example.

If your application has slightly more advanced authoring features you will also be able to add your own chapter points from which menu buttons can be created. If you can, consider creating your own menu structure which will enable you to organise your material in a hierarchical fashion with sub menus.

This is preferable to a linear menu because you can find what you're looking for in a couple of clicks, without having to trek through a lot of pages. If, for example, your three-hour DVD has a chapter button for every five-minute scene, that amounts to 36 buttons or six pages of six-button menus.

Hopefully now you are equipped with the knowledge and resources to get cracking with that oft-deferred project. But it can be a time-consuming process, so we would suggest you don't try and do everything at once.

Experiment and try out the various options with a short piece of footage to get a hang of the techniques and develop a workflow that you are comfortable with. Happy digitising! **PCW**

Other codecs

The only codec you need to know about for making DVDs is MPEG2.

But if you want to encode HD video, put movies on a website, or play them back on a handheld, you might want to expand your codec horizons.

As MPEG2 is a patented and licensed technology, there's really no such thing as a free MPEG2 codec – there are open source codecs (Ffmpeg is one) but the legal status of these is rather unclear. Windows XP doesn't include an MPEG2 codec, but Vista Home Premium and Ultimate do.

Additionally, those Vista versions include the DVD Maker program that will let you create basic menus and burn DVDs.
If you want a quality commercial codec, one of the cheapest routes is to buy the well-regarded Tmpgenc Plus 2.5 package ($37, around £19, from **http://tmpgenc.pegasys-inc.com**). This will allow you to encode AVI files into MPEG2.

More expensive versions, such as Tmpgenc Express 4.0 ($99.95) are available that includes all the codecs listed below.

If you have purchased the DVD edition of *PCW*, you will find some great free programs in the Resources section under the Audio/Video and Burning categories, including Video DVD Maker Free which can capture video and create basic DVD video discs.

Here's a quick run through some of the most common codecs you'll encounter.

MPEG2

Best known as the codec used for DVD-Video. It's also used in broadcasting, but is not a good format for editing, as many of the frames are interpolated, making it hard work for graphics processors.

MPEG4

Provides better quality than MPEG2 at lower bit rates and smaller file sizes. Supports a wide range of bitrates making it suitable for applications from the web and mobile phones to HD digital broadcasting.

H264

Also known as MPEG4 Part 10 or MPEG4 AVC. H264 is one of the standards supported by Blu-ray disc for HD content. The BBC and Sky use it for their HD broadcasts.

DivX

Another MPEG4 variant. As well as a codec DivX has produced a media player and authoring software and developed DivX into a container format, like AVI and Quicktime. Many DVD players now support DivX natively.

WMV

Windows Media Video is both a container format and a codec, developed by Microsoft. It's supported by Windows Media Player, the Xbox 360, Windows Mobile handhelds and Microsoft's Flash competitor, Silverlight. There's also a high-definition version, WMV-HD.

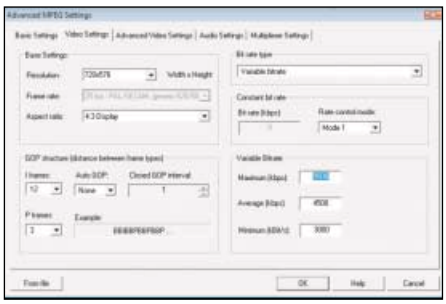
Converting VHS to DVD using Rescue your Videotapes

1 Connect your camcorder or VCR to the video converter using an S-video cable if it has an S-video port. Otherwise connect the composite video output to the yellow plug on the converter and connect the red and white audio outputs from the VCR to their equivalent-coloured inputs on the converter. Alternatively, if the VCR has a scart socket use the supplied converter cable as shown here. Power up the VCR, insert a tape and press play.

2 Launch Magix Movies on DVD 7. In the New Project disc settings panel, name your new project, select a disk space preset such as DVD and click OK. Click the recording button to the right of the preview screen, followed by the Analogue video button in the Recording source selection panel. The Video recording capture window will now open and you should see your video playing in the preview window. If you can't see the video, check the input selection is correctly set for either 'Comp or S-VHS', depending on whether you are using the Composite, or S-video input connector.

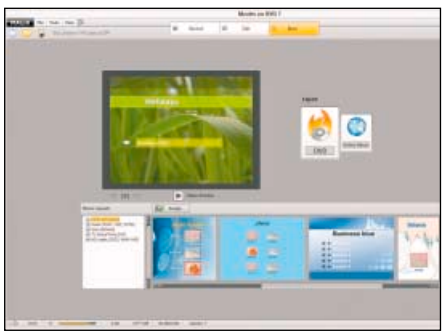
3 Click the browse button alongside the 'Save file in the following folder' field and navigate to the folder where you want to save your captured video files. Depending on the capture codec you use, a three-hour tape could occupy up to 6GB on your hard drive – so make sure you have plenty of available space. Click the recording quality pop-up menu in section 3 and select a recording quality. If you plan to edit the captured footage, select one of the Magix MXV codecs at the appropriate quality for your intended output – for example, DVD requires the MXV: DVD quality choice.

4 If you plan to record the captured footage straight to DVD choose the MPEG DVD Recording quality setting from the pull-down menu. Follow the instructions to activate the MPEG2 codec if you haven't done so before. The advantage of choosing an MPEG2 codec is the captured file can be written straight to DVD without the need for transcoding, this will save a lots of time when it comes to burning your DVD. Choose the MPEG:DVD preset or select MPEG:User defined and click the Configuration button to set your own bitrate. See the section on encoding and burning for more about choosing MPEG2 bitrates.



5 Use the VCR controls to cue the tape to the position you want to start recording from. If you want the recording to stop automatically after a specified time period, check the Record time limit box and enter a period in minutes in the field in panel 4. Press the red record button to start capturing. If you haven't set a record time limit, you will need to press the stop button when you reach the end of the tape. If you experience problems, with sound synchronisation for example, try capturing the footage in fifteen-minute segments, rather than one big chunk. When you've finished capturing click OK to close the capture window.

6 Click the Burn button at the top of the screen and choose a menu template from the Menu Layouts scroller. Choose DVD from the format pop-up menu in the bottom left corner. The status bar shows how much space your footage will occupy on the DVD, the playing time and the number of scenes. A scene is created for each clip on the editing timeline, so if you want menu buttons for more scenes, click the Edit button and use the editing tools to make cuts in the footage. Finally, insert a blank DVD in your writer and click the DVD Export button.



Always scan anywhere.

How can we help?
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Lock down your PC

Jason d'Allison shows you how to use the free Windows Steady State tool to create an almost indestructible Windows installation, suitable for use at home or in the office

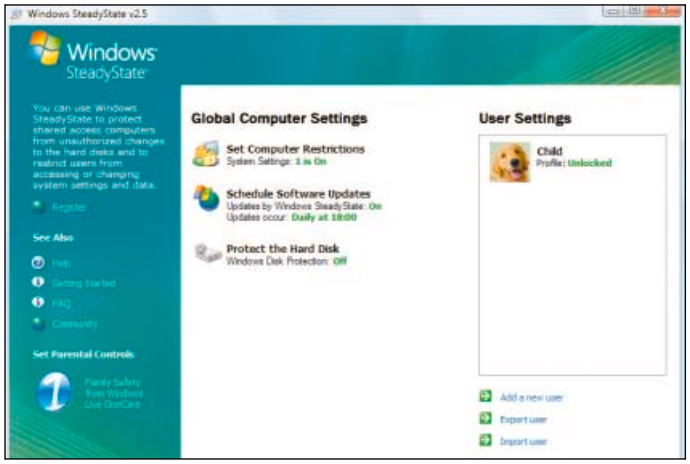
If you've used a PC at a library or internet café, you've probably discovered that it's been 'locked down'. In all likelihood, Windows will have barred you from installing new programs, launching the Run dialogue and fiddling about in Control Panel. It's understandable, of course – no administrator wants to deal with a Windows installation trashed beyond redemption by a vandal or inexperienced user.

Many shared, public PCs are configured using Microsoft's Steady State (the new name for the Shared Computer Toolkit). This provides administrators with an easy method of implementing user restrictions. It's suited not only to commercial and institutional environments, but is also perfect for the home. If you're setting up a PC for a child, for instance, Steady State will give you almost total control over what they can and can't do.

One of the best things about Steady State is the cost: a grand total of nothing. You're good to go so long as you're running Windows XP Home Edition, XP Professional (32-bit only), XP Tablet PC Edition or any flavour of Vista (again, 32-bit only). To download it (it's only 6.4MB) and get underway, go to **www.tinyurl.com/376exg**.

Getting started

Steady State needs to be installed and configured under a standard user account (one with administrator privileges). When you fire it up, you'll see that it's split into two areas: Global Computer Settings and User Settings. Most of the action will take place in the latter. To begin then, click 'Add a new user' (you can add as many as you like, each with their own set of restrictions). Simply go through the usual routine of choosing a name, icon and password (this is optional).



Once you've created a new Steady State account, you can dive into its User Settings and start locking it down

Preparing a user account

With the new Steady State account created, you'll see a page with four tabs – General, Windows Restrictions, Feature Restrictions and Block Programs. For now, whizz through the lot and untick everything, leaving the account almost completely unrestricted.

Next, if there are any programs not yet installed that you want the Steady State user to be able to access, install them now. When you've finished, log out of the current account and log into the Steady State account (its icon will appear on Windows' standard login screen, alongside the icons for your 'normal' accounts). Once logged in, remove any desktop icons for programs you won't be making available. Likewise, create any necessary icons for programs you *will* be making available.

In our example account, we've got icons for Adobe Reader, Deepburner, Internet Explorer, Live Messenger, Media Player, Photo Gallery, a selection of Windows' games, and the Calc and Writer elements of Open Office.

You might want to adjust the way Windows looks, too. For us, the interface defaulted to Windows Standard (similar to Windows Classic), but we're running Vista, so we've changed this to Windows Aero.

Setting user restrictions

Now you need to log out and get yourself back into the account you were using earlier. Once there, launch Steady State and click the new account's icon (under User Settings). It's time to start applying some restrictions.

Under the General tab, there are two timers you can set – one logs the user off after a specified idle time, one logs them off after a specified session time. Setting the latter is a great way to stop a child from sitting at the PC for unhealthily long periods (although of course they can always just log back on). If desired, you can have the timer shown permanently onscreen as a countdown.

When the user logs off (either voluntarily or as the result of a timer), you can also have the PC automatically restart. This option is useful if you're implementing Disk Protection (see How to Tweak Steady State's Disk Protection on page 40), but don't use it if the PC has other accounts and is set up for Fast User Switching – anyone else logged on will lose all unsaved data.

The majority of Steady State's options – over 80 of them – are grouped under the Windows Restrictions and Feature Restrictions tabs. Among many other things, you can

Alternatives to Steady State

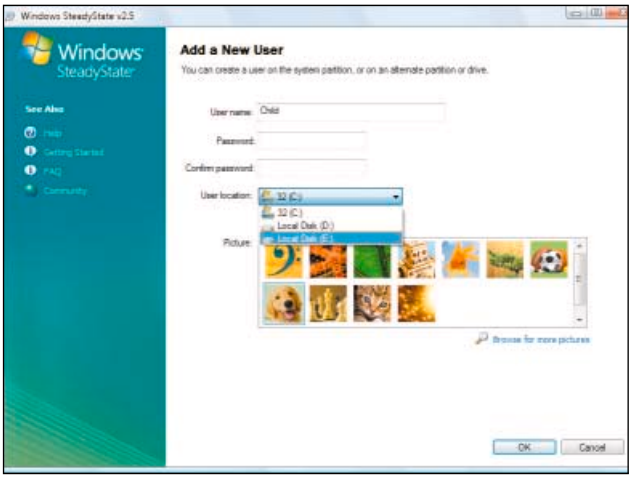
Where there's a market, there's usually competition, and so it is with Steady State. Out of the several alternatives to Steady State that are available, probably the most prominent are Deep Freeze (**www.tinyurl.com/yre2rh**) and Clean Slate (**www.tinyurl.com/5lvwlk**). However, both products have a major disadvantage – they cost money. Indeed, Deep Freeze costs £22.50 and Clean Slate $59 (around £30).

Both rivals are pretty much limited to disk-protection functions, too – they don't offer the wealth of other lock-down features of Steady State. However, Clean Slate can be used in conjunction with a utility called Fortres 101 (**www.tinyurl.com/624nyu**), which offers similar functionality for an additional $59.

Microsoft might be a company we all love to hate, but you can see that in offering Steady State for free, it's being particularly generous.

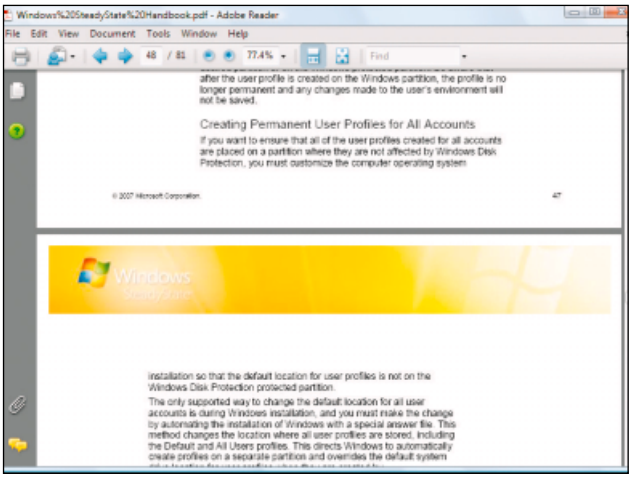
down your PC down your PC down your PC

How to tweak Steady State's Disk Protection

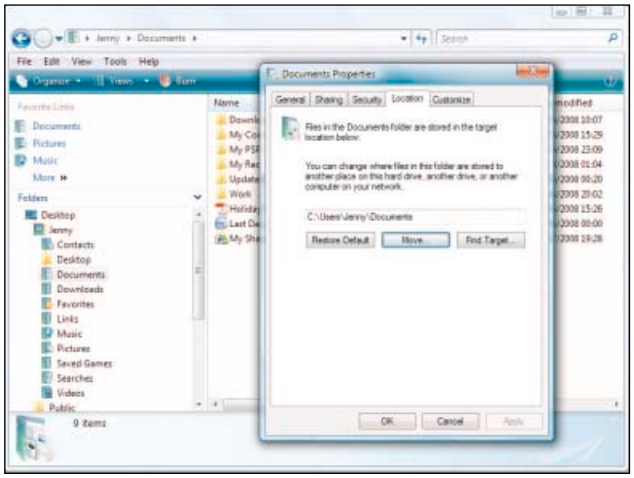


1 Disk Protection is great, but it can be somewhat inflexible. As you've seen, it will stop every one of the PC's users from permanently storing personal data on the system partition. That typically means everyone is forced to use some sort of portable storage device for opening and saving documents. There are ways round that, though. For example, when you add a new Steady State user, you're given the chance to specify the location of their profile. By default, this is the system partition, but it doesn't have to be – you can choose any partition you like.

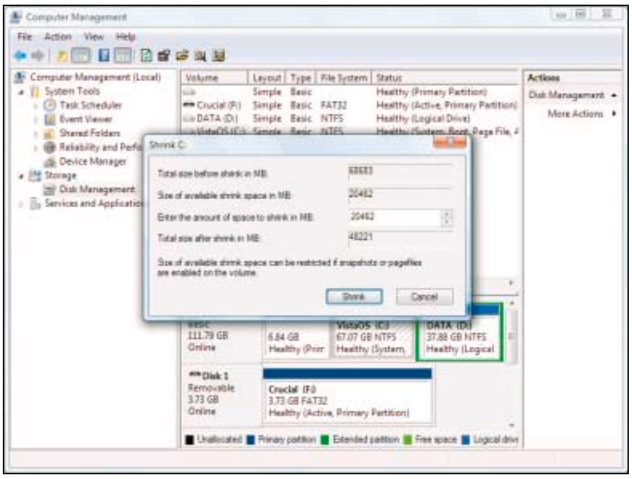
2 When the user's profile resides somewhere other than the system partition, changes made to it will be retained – even if the user logs off or the PC is restarted. The user can customise the desktop (within the limits of any restrictions) and store files in My Documents and so on. Disk Protection will leave the profile alone, although naturally the system partition will still be safeguarded. Just remember not to hide the profile partition's drive letter. Leave the profile unlocked, too, as otherwise it will get reset when the user logs off – regardless of its location.



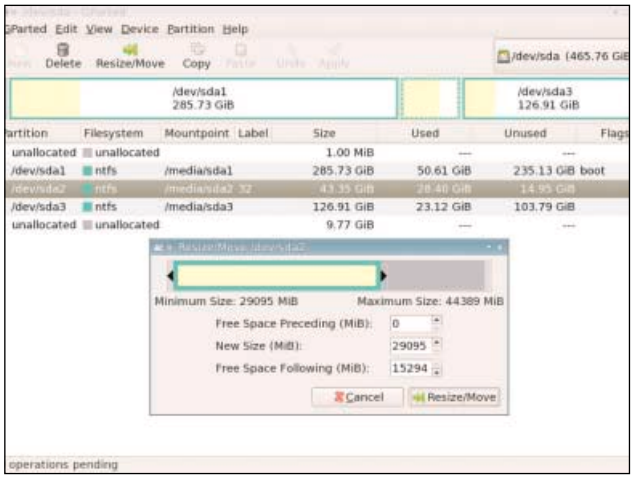
3 Can the profiles of non-Steady State users also be stored somewhere other than the system partition? They can, but usually only if it's done when Windows is first installed – you need to run the installation in unattended mode and supply an answer file. For more details, read Microsoft's free Steady State Handbook at **www.tinyurl.com/5pt3x4**. It's just about possible to move a profile after Windows has already been installed, but it involves some complex registry editing. If you're interested, start your research at the blog of Joshua Mouch (**www.tinyurl.com/2fzw9h**).



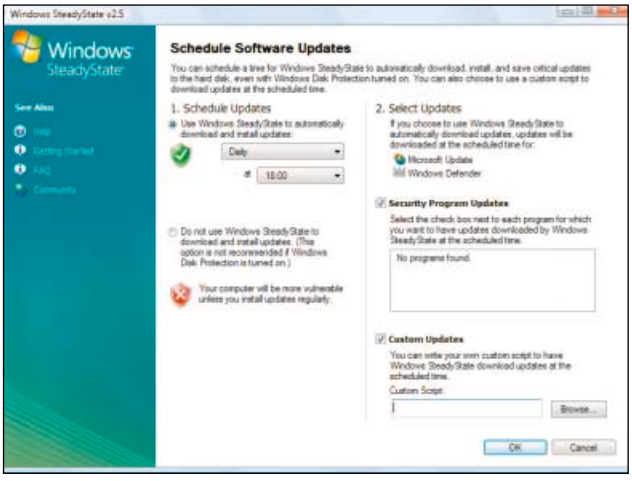
4 One thing you can do fairly easily with a non-Steady State account is move the location of the user's personal data folders: My Documents, My Music and so on. If the location is another partition, then the folders will naturally be left untouched by Disk Protection. To do this in Windows Vista, log onto the account that owns the folder you want to move, open Windows Explorer, right-click the desired folder, click Properties, and finally select the Location tab. Click on the Move button and then follow the instructions. In Windows XP, this process is almost identical.



5 If the PC's hard disk currently has just a single partition, performing any of the previous steps will require you first split it in two (or three or four...). In Vista, click Start, right-click Computer, then click Manage. In the Computer Management applet, click Disk Management, right-click the partition, click Shrink Volume, enter the capacity to be split, then click Shrink. The free space will be shown as Unallocated. Right-click it, select New Simple Volume and follow the instructions. Repeat this final stage if you want to use the free space to create further partitions.



6 If you're using XP, you won't be able to shrink a partition without using a third-party utility. The best-known is probably Partition Magic (**www.tinyurl.com/5akycz**), which isn't free, so it represents poor value if you'll only use it once. An excellent alternative is the 'live' version of the GParted Linux distribution, which we looked at in PCW, August 2008. Download 'gparted-livecd-0.3.4-11.iso' from **www.tinyurl.com/rk4qp**, burn it as an ISO image to a blank CD, then use the CD to boot the PC. The Resize/Move option will allow you to achieve the same goal as step 5.



7 While Steady State can bypass Disk Protection to install critical Windows updates, it's not so clever at bypassing it to accommodate other maintenance tasks. How do you update your anti-malware packages, for instance? The packages Steady State can handle automatically are limited to Windows Defender and a handful of outdated products from Computer Associates, Trend Micro and McAfee. One way to get Steady State to auto-update a different piece of software is to write a custom script. However, this process isn't at all well-documented and we've never really got it to work satisfactorily.

8 The obvious solution, then, is to switch Disk Protection off whenever you need to undertake some maintenance. The snag there, though, is that Steady State will have to delete its cache file and reboot the PC, which can take several minutes. What's more, when you switch Disk Protection back on, the cache file will have to be recreated – there will be a further reboot, too. Instead of switching Disk Protection off, then, select 'Retain all changes permanently'. This merely puts Disk Protection 'on hold'. When you've finished updating, change back to 'Remove all changes at restart'.

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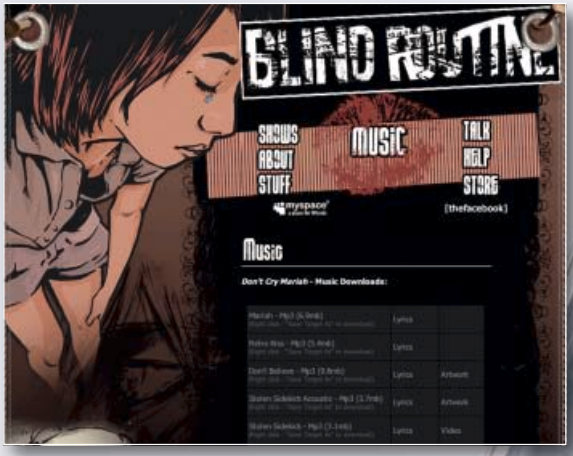

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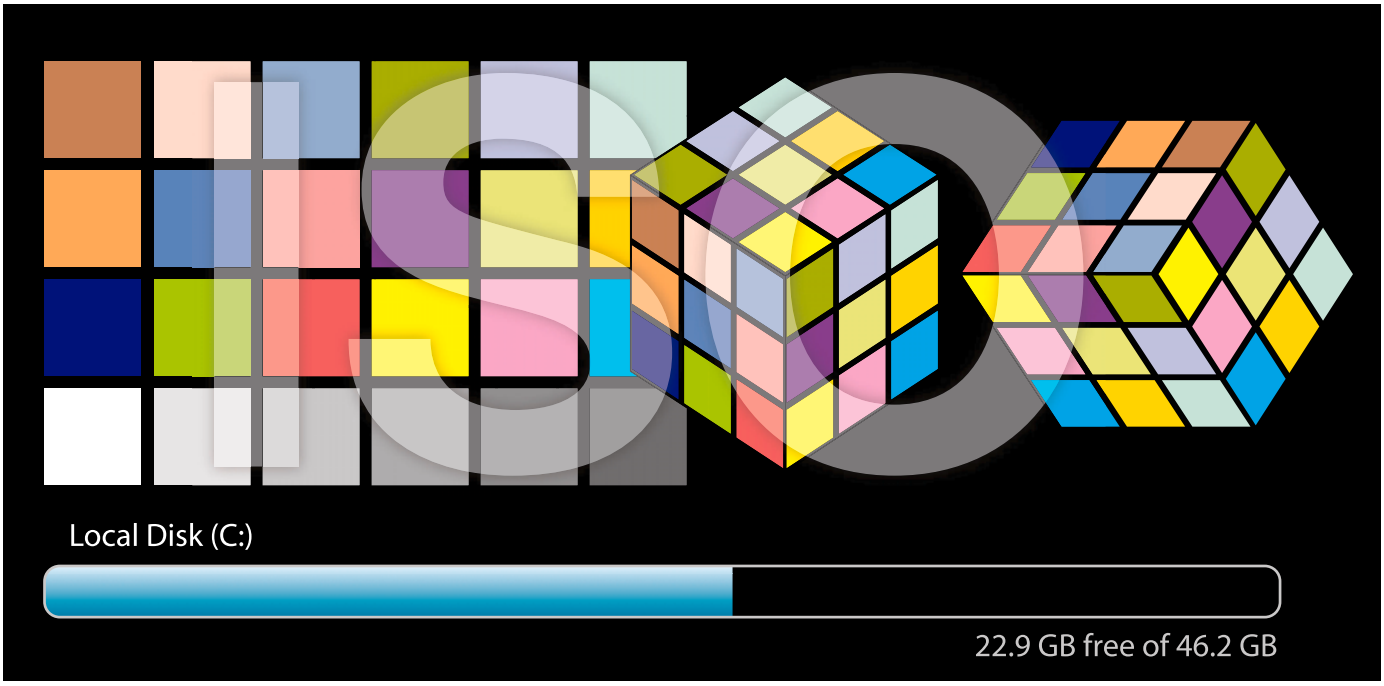
Image is everything

Disc images, such as ISO files, are incredibly useful and not difficult to use once you understand the basics. Scott Colvey and Kelvyn Taylor explain

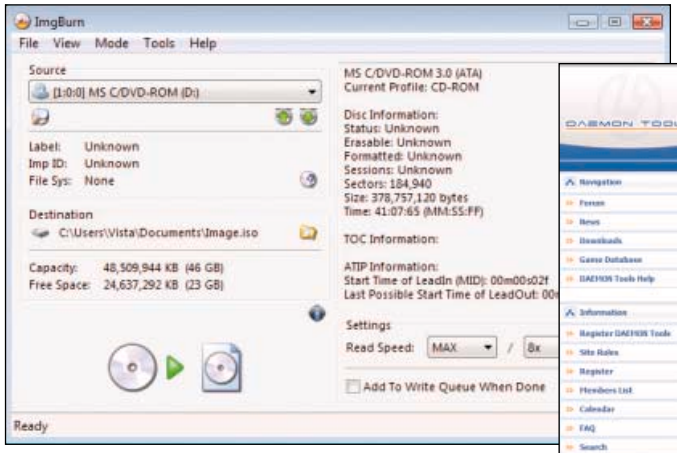


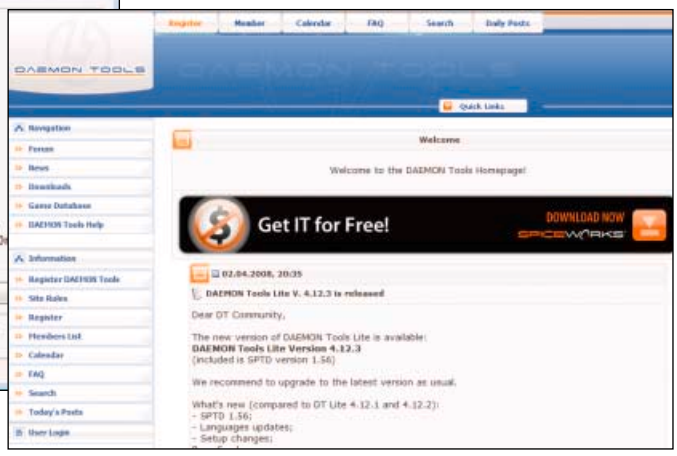
Anyone who has experimented with the Linux operating system will be familiar with ISO image files, but even if you haven't ventured down this route, it's highly likely that you've heard the term. But what are these files and what purpose do they serve? A good way to think of an ISO file – a shorthand term derived from the ISO 9660 standard that defines the file structure of CD-Rom discs – is as a disc image, because it contains the entire contents of a CD or DVD within a single file. It's effectively a snapshot of the disc contents, including the directory structure and other information, transposed into a single file. In much the same way that a compressed file such as a ZIP can contain hundreds or even thousands of files, an ISO is simply a container for many files and directories. Importantly, though, it can be used to recreate an an exact replica of the original disc it represents.

For many *PCW* readers this may seem old hat, but it's easy to forget that you've got to start somewhere, hence we've started this occasional series with a 'back to basics' theme for those readers who are just getting to grips with the more advanced side of personal computing. In this month's feature we're going to look at the various uses for ISO files – and other similar formats – and the tools needed to work with them.

Introducing ISOs

The ISO format is most commonly used as a means of software distribution via the internet. It has historically been most commonly associated with Linux distributions, which can be packaged into a single big file for downloading. Rather than making the individual files on a CD or DVD





Left: Daemon Tools Lite is a free tool that lets you mount ISO files as virtual discs

Far left: Imgburn is a quick and easy way to work with ISO image files

Nero is a popular disc-creation tool that lets you burn CDs and DVDs from ISO files

available for download, or supplying software on a physical disc, it is generally cheaper, easier and more reliable for companies to use this method to transfer large volumes of data. The benefits of this method over transporting discs are obvious – not only are there no postage costs involved, but there is no risk of a disc being lost in transit. It is also quicker to download one big file than lots of individual

'The ISO format is also useful for the purposes of backing up data'

files, and you can reduce the risk of files going missing or getting corrupted in the download process. Finally, ISOs make it possible to download an entire directory structure of unlimited complexity, something that's not possible when downloading individual files.

Burn an ISO image onto a CD

In this feature we've concentrated on working with ISO files in a virtual format but there will be occasions when it makes sense to burn the files to disc to create a standard CD or DVD. This is a feature supported by most disc-burning tools, such as Nero, as well as the previously mentioned Imgburn.

To create a disc from an image using Nero 8, insert a blank CD or DVD as applicable and click on the Recorder menu followed by Burn Image, before selecting the relevant image file. If a single file is needed from an ISO file, it can be extracted in much the same way that files can be extracted from ZIP files. A popular compression tool to use is Winrar (**www.rarlab.com**). Check out this month's cover disc for these and other suitable utilities.

It's also worth knowing that, while the ISO format is the best-known disc image format, it is far from the only option. Nero can create images in its own .nrg format, and .bin and .cue files are also common.

A popular alternative to Daemon Tools is the Alcohol software (**www.alcohol-soft.com**) which creates .mdf/.mds images as well as working with other common formats. But in spite of the competition, ISO files remain the most popular and widely supported format.

Why use ISO files?

Once an ISO file has been downloaded there are two basic uses for it. The first option is to use the ISO to burn a new CD or DVD in order to access the files it contains; the resulting disc can then be used in precisely the same way as any other CD or DVD. The alternative is to use image-mounting software to convert the image file into a virtual disc that can then be loaded into a virtual optical drive and used just as if it was a real disc.

The ISO format is also useful for the purposes of backing up data. With most modern PCs fitted with recordable CD or DVD drives, many people use these to create backups of important data. Having one backup copy of files is all well and good but more than one is advisable. Rather than wasting space by storing multiple copies of the same CDs and DVDs, discs can quickly and easily be converted into ISO images, which can then be stored on a hard disk in a safe place. This means that even if your original disc gets damaged or lost, you should be able to recreate it (as long as the disc isn't copy-protected).

Of course, storing ISOs on a hard disk isn't a fail-safe backup method – it's an additional measure, not a substitute. A better use for ISO files might be to store backup copies of all your commercial software CDs

Microsoft's hidden gem

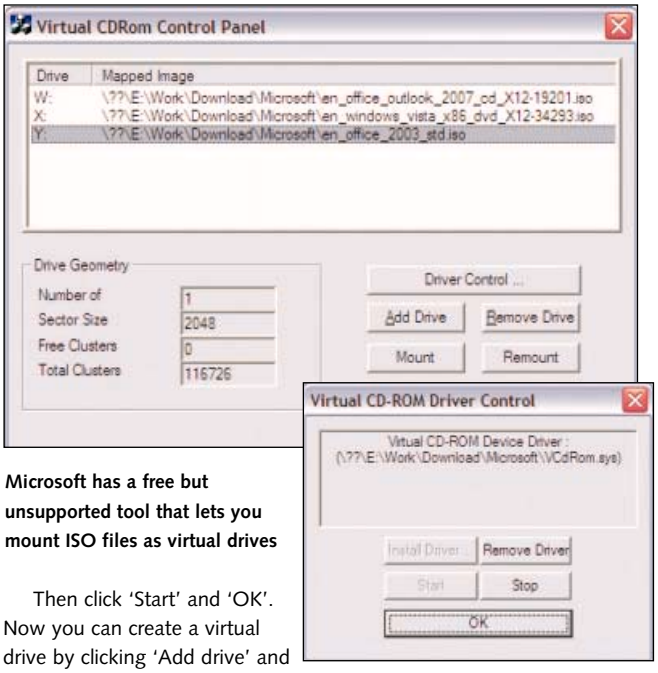
No versions of Windows support working directly with ISO or other image files; a great omission according to most users. But for some time Microsoft has provided a little-known tool that lets you mount ISO files as virtual drives in Windows XP Home or Professional (it doesn't work in Vista), just like Daemon Tools and other programs.

You can download the Virtual CD-Rom Control Panel program as a self-extracting .exe file free from the Microsoft site at **www.tinyurl.com/tyxx**. It's not the prettiest tool around, and there's no documentation or support for the program, but it does the job and is very light on system resources.

Run the installation file, which will unzip three files to a directory of your choice. The 'Readme.txt file contains detailed instructions on how to run the program – just note that where it talks about the '%systemroot%' folder it means the folder where Windows is located, such as C:\Windows.

The first time you run the program you need to click the Driver Control button and tell it where the VCDRom.sys file is located, which if you've followed the instructions in the Readme file should be in \Windows\system32\drivers folder.

However, we found that it doesn't seem to matter where you keep this file. Once you've shown it where the driver is, you don't need to tell it again.



Microsoft has a free but unsupported tool that lets you mount ISO files as virtual drives

Then click 'Start' and 'OK'. Now you can create a virtual drive by clicking 'Add drive' and then mount an image file by clicking Mount. Once an image is mounted, it will persist until you reboot your PC.

and DVDs on the hard disk: this has the added benefit of giving access to these titles without having to reach for the original CD or DVD. We'll come to this soon.

Making an ISO file

A computer that's fitted with a recordable drive will usually have commercial disc-burning software, such as Nero or Roxio, pre-installed. Such programs can usually be used to create ISO files. In the case of Nero, launch the program and insert the CD or DVD that is to be converted into an ISO file. Now click on the Extras menu and select Save Tracks before selecting 'ISO image file (*.iso)' from the dropdown menu labelled 'Output file format'. Click on the Browse button to choose a folder in which to save the file and then click on Go to begin the process.

While Nero is capable of creating ISO files using this method, it is a little convoluted. A simpler option is Imgburn, which is a free program that can be downloaded from **www.imgburn.com**. Once downloaded and installed, launch the program and click on the 'Create image file from disc' button. Indicate where the file should be saved and then click on the button at the bottom of the screen to start the creation process.

To create a disc from an ISO file, simply choose the 'Write an image file to disc' option and put a blank recordable disc in your drive. Choose your image file and click the Write icon at the bottom of the screen.

Mounting an ISO file

While ISO files provide a very useful means of distributing and storing data, most people won't need this on a daily basis. Arguably the handiest use for ISOs is to serve as virtual discs. Some software titles, notably reference titles, run entirely from CD or DVD and require the relevant disc to be physically in the drive at time of use. Unless your computer is fitted with multiple optical drives, this leads to the hassle of disc swapping and the need to track down the relevant discs whenever they are needed. But with ISO files, you could store a large number of frequently used discs on a hard disk so they are never more than a few mouse clicks away.

To make use of ISO files without burning them to disc you'll need an ISO-mounting program. As Windows doesn't support this feature natively (but see the boxout 'Microsoft's hidden gem' for more on this), we're going to use Daemon Tools Lite, which is free and easy to use. Download the latest version from **www.daemon-tools.cc**. Install this program, restarting Windows to complete the process. The program will relaunch the second stage of the installation process after the reboot, but untick the boxes labelled 'Daemon Tools sponsor ad module' and 'Daemon Tools default Search Provider' to prevent the installation of unwanted components. At the next screen you'll probably also want to decline the option to change your web browser's home page to Daemon Search.

> **'Arguably the handiest use for ISOs is to serve as virtual discs'**

If the files need to be accessible every time Windows is used, right-click on the Daemon Tools icon in the Notification Area, click on Options and ensure both Automount and 'Autostart tray icon' are ticked. Use the information in the mini-workshop on the following page to find out how Daemon Tools can be used to load ISO files into virtual optical drives. With the option of creating up to four virtual drives, this should reduce the need to physically swap CDs and DVDs.

Swapping virtual discs

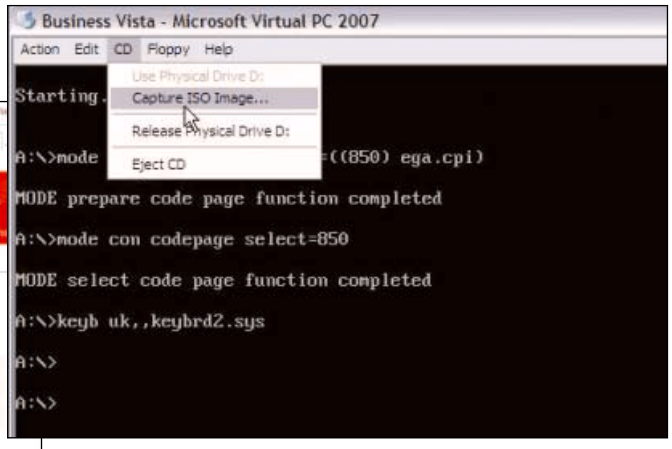
Depending on the type and number of disc-dependent programs you use, there may be occasions when even virtual discs need to be swapped. This can be done by selecting the option to unmount the image, which then frees up the drive ready for another image file to be loaded. While ISOs can be unmounted individually, it's also possible to unmount all the loaded images at once using a keyboard shortcut. This needs to be manually configured, so right-click on the

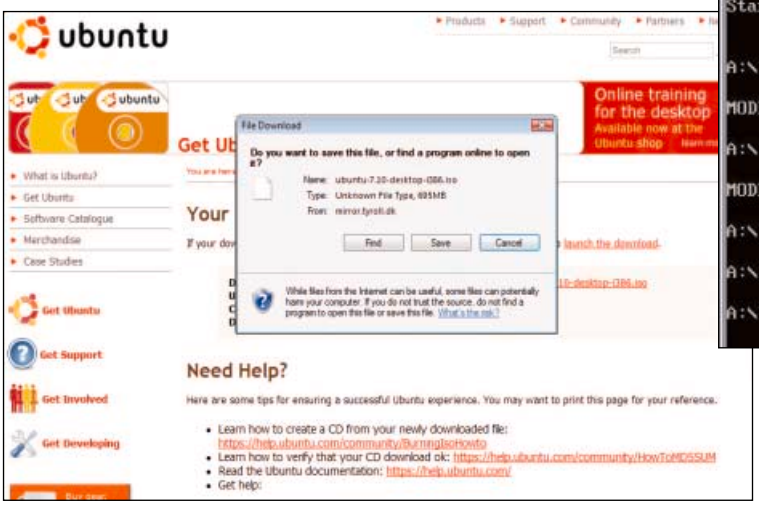
Creating bootable ISOs

Most readers will be familiar with booting a PC from a CD or DVD disc. This is possible thanks to an extension to the ISO 9660 standard called El Torito. This specifies the extra information that needs to be included on a disc if you want to let a PC know that it's bootable. If a PC's Bios supports the El Torito standard, whenever a disc containing the required information is inserted, the PC will attempt to boot from the disc. On some PCs you might see a message such as 'Hit any key to boot from CD...', which indicates that an El Torito disc has been detected.

The good news is that ISO files can also contain this information, so any discs burned from a bootable ISO will also be bootable. Simply create the CD or DVD as explained in the main feature, there are no other special steps to consider.

Creating a bootable ISO image is possible, but it's a trickier process and not suitable for treatment in an introductory article.





Above: Microsoft's Virtual PC 2007 virtualisation software can boot from a suitable ISO image, or mount an ISO image into a virtual PC

Left: Linux distributions such as Ubuntu are commonly distributed as ISO images

Daemon Tools Notification Area icon and select Options followed by 'Hot keys'. Click within the 'Unmount all' box and press a key on the keyboard (such as 'U' for 'unmount'). After clicking on OK, pressing Ctrl, Alt and the chosen letter simultaneously will in future automatically unmount all loaded images in one fell swoop.

As well as the obvious benefit of reducing the amount of disc swapping that needs to be carried out, the program enables disc images to be treated as if they were physical discs – and Windows will not see them any differently. There are numerous uses for this type of disc emulation, besides ensuring that reference or game discs are always available. You might, for example, work with software that is not compatible with Windows Vista. One way to get around this would be to set up a dual-boot system, but this can be tricky, particularly if Vista is already installed. Microsoft has made Virtual PC 2007 available free of charge, and this is virtualisation software that can be used to install additional operating systems on a computer without the need to partition the hard drive or configure a multi-boot system.

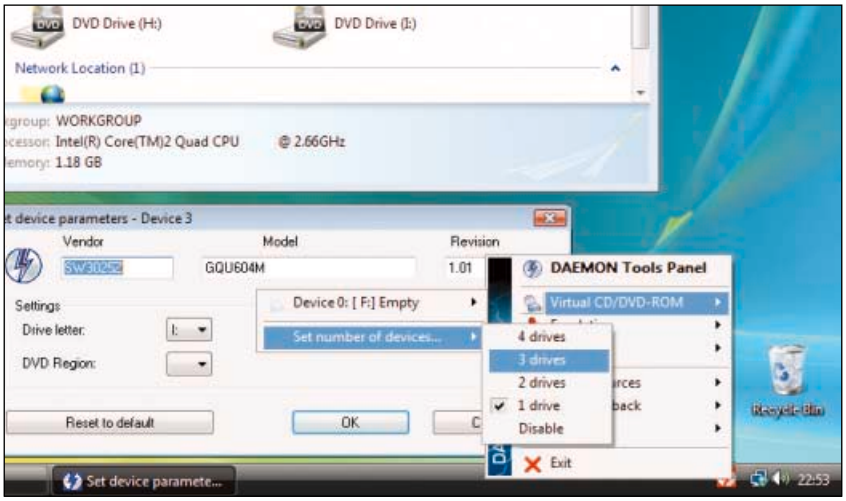
'Notebook PC users can make use of ISO files to lighten their luggage'

Virtual PC 2007 can be downloaded from **www.tinyurl.com/2ecarc** and once installed you can quickly configure a virtual PC. As mentioned, an operating system needs to be installed on the virtual computer before it can be used, and to save having to search for an installation disc whenever operating system components need to be installed or uninstalled, the program allows for the use of image files in place of physical discs. From the CD menu of Virtual PC, click on the 'Capture ISO Image' option before selecting the relevant ISO file. ISOs can also be used by other virtualisation tools, such as VMware Server (**www.vmware.com**) or Sun's Virtualbox (**www.virtualbox.org**).

ISOs to go

Notebook PC users can make use of ISO files to lighten their luggage. By creating ISO files from software CDs and DVDs, it is possible to dramatically reduce the number of items that you need to carry around. ISO files can also be accessed far more quickly than data stored on an optical disc, and the fact that the optical drive is not being used helps to conserve battery power. There are countless uses for image files and, with so many free programs to take advantage of them, there is good reason to investigate how you could benefit from their use. **PCW**

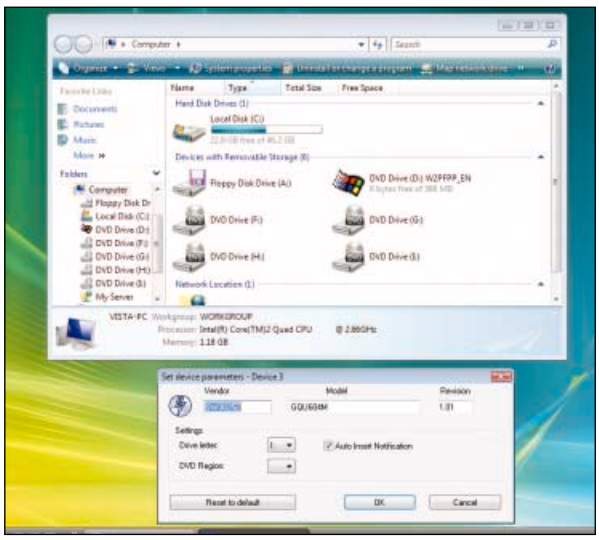
Working with Daemon Tools



1 Configure the available number of virtual drives by right-clicking on the Daemon Tools Notification Area icon and selecting Virtual CD/DVD-Rom, followed by 'Set number of devices', and then clicking on 1, 2, 3 or 4 drives.

2 Drives that have been configured are immediately accessible via Windows Explorer. To customise drives, right-click on the Notification Area icon, select Virtual CD/DVD-Rom followed by a virtual drive and then click 'Set device parameters'. Drive letter, region and labels can be adjusted here.

3 To mount an image file, click on a drive letter from the Daemon Tools context menu (right-click on its Notification Area icon) and select 'Mount image'. Browse to an ISO image file and double-click on it to load it into the virtual drive. The image can then be used in the same way as a physical disc.



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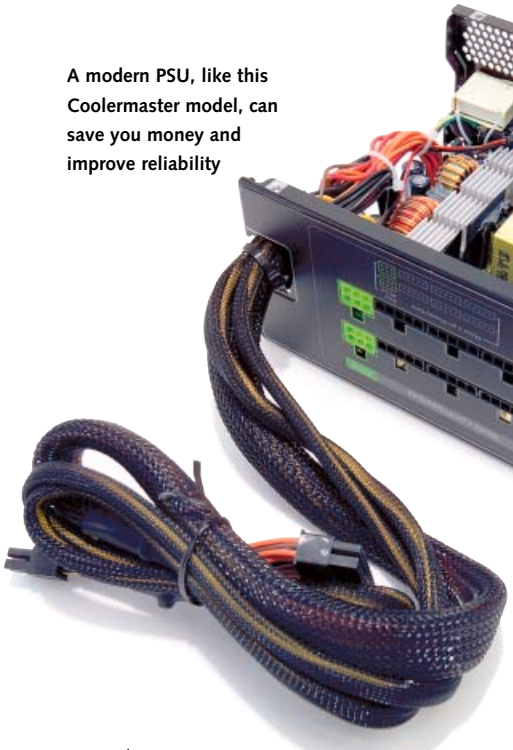
Switch on and save

Choose the wrong power supply and your PC could end up costing more than you think. Nigel Whitfield investigates

If you're thinking about upgrading or building a computer from scratch, the important parts that first spring to mind are almost certainly the processor, motherboard and hard disk. But there's one part without which none of the others will work – the power supply unit (PSU). Yet all too often, it's an afterthought; you put together a PC, painstakingly choosing the right components, then simply accept the no-name power supply that comes with the case.

If you do think about the PSU, it's usually in terms of whether or not it has enough oomph for all the things you're fitting in the case. And upgrading? Well, that will probably only happen if the old one blows up.

The power supply is one of the most crucial elements in your PC, but it is also one of the most ignored, except perhaps by a hard core of upgraders and tweakers. In this article, we explain why you should pay more attention to your PSU, and what you should look for when choosing a new or replacement one.



A modern PSU, like this Coolermaster model, can save you money and improve reliability

Power behind the button

Before looking at the technology inside PSUs, it's worth remembering how crucial they can be. If you've ever dabbled with overclocking, or read about it in *PCW's* Hands On section, you'll know that one of the key parts of making a system run well when overclocking is adjusting the voltage of different parts of the memory and/or processor – sometimes in quite small increments. This gives you a big clue that getting the right amount of power to the right parts of your PC is vital. And it doesn't apply to just overclockers.

If you don't have a stable source of power, you'll suffer random crashes and freezes. In a modern PC, there can be quite a lot of demands on the power supply – from hard disks spinning up to high-end graphics cards. In high-end systems, there may also be sophisticated coolers that require pumps, fans and thermo-electric elements.

A good power supply must ensure that your PC's motherboard has all the power it needs without voltages fluctuating. In a modern PC, the PSU provides a range of voltages – 5V, 3.3V and 12V. If your experience of PSUs is limited to the sort of hefty transformers used for model railways, you may well be surprised at the relative lightness of a modern PC supply.

Switch on

PCs use a type of PSU called 'switched mode' (also known as switching or switch mode). In a more traditional power supply, a large transformer first steps the mains voltage down, then it's converted from alternating current (AC) to direct current (DC), and smoothed and regulated to ensure the correct stable voltage is delivered. And in this type of power supply, a proportion of the energy drawn from the mains is lost as heat in the transformer.

Switched mode supplies work rather differently – although they still have a transformer, it's not connected to the AC mains. Instead, the power that arrives is converted directly to DC. Often the rectifier circuit that does this can also work as a voltage doubler; the switch between US and European voltages in effect turns this on/off, so the rest of the design will work identically anywhere in the world.

Since it's created from the alternating current mains, the DC power will rise up and down, so it's smoothed out and used to feed a high-frequency oscillator (a transistor that switches on and off rapidly, hence the name switched mode). That might sound a little odd (converting AC to DC and back again), but the oscillator makes a square wave – one where the new AC current is off or on, rather than rising and falling like the mains. And it takes advantage of one of the useful properties of transformers; for a particular size of transformer, the amount of power it can handle increases with the frequency, so instead of a huge mains transformer operating at 50Hz, a switched mode PSU can use a smaller transformer operating in a range from 10s to 100s of kilohertz.

The output of the transformer is converted to DC again and regulated to provide the appropriate voltages to supply the PC. The outputs are also monitored and a feedback system uses the output voltages to control the oscillator, ensuring the output is kept within pretty tight tolerances.

Switched mode power supplies can be more compact and efficient than traditional ones. And since they don't rely directly on the input, but instead on AC generated by the oscillator or 'chopper' transistors, they're less susceptible to interference from the mains. Conversely, a poorly designed switched mode PSU can feed back interference to the mains supply from the high-frequency switching. That's why cheap power units, such as telephone chargers, sometimes cause problems with home powerline networking systems.

Efficiency

While all switched mode power supplies are based on the same principles, they're far from equal. As well as things such as the amount of interference they can cause to the mains supply, there are other differences, too. One is called the 'power factor'. A PSU with a lower power factor requires more energy from the electricity supply to deliver the same amount of power to the computer. The power factor isn't the only thing to bear in mind, though. Just as with other sorts of power supply, the one in your computer generates some heat, although nowhere near as much as if it was used as an ordinary transformer. And some of the energy is lost through the other components in the power supply, too.

Don't forget that in a modern PC, the power switch often doesn't disconnect the mains, as it would in older ones. Instead, there's a small amount of power used all the time, allowing systems to wake from sleep at the touch of a button, or be powered on and off remotely. Some subsystems run all the time – for example, to power system Ram in Vista's hybrid sleep mode.

A few years ago, we might not have considered how important the efficiency of a PSU is, but with fuel bills soaring and at the same time some components, such as graphics cards, becoming more power-hungry, if you're looking for a new PSU, you should consider how efficient it is. You might also be alarmed at how inefficient some may be. For example, *PCW* labs tested some that were only 46 per cent efficient; in other words, 54 per cent of the power taken from the mains was wasted, leaving users to pay for twice as much as the PC itself actually used.

In some circumstances, it can even be worse than that. An inefficient PSU creates more heat, and in an office or server room full of them, more energy is needed for air-conditioning to maintain a suitable temperature. So, whether it's for a home PC or a whole office full of them, making the power supply efficient is becoming more important.

Star ratings

The latest versions of the Energy Star (**www.energystar.gov**) ratings in the US require a minimum efficiency of 80 per cent for power supplies, as well as specifying the maximum power consumption in sleep and standby modes. As they're required for US Government purchasing, most main brands comply.

The 80Plus programme (**www.80plus.org**) is a labelling system for PSUs that fit the new criteria – being at least 80 per cent efficient at 20, 50 and 100 per cent of their rated load. That's important because power supplies are often less efficient when they're not fully loaded, so while it might seem tempting to choose a higher rated PSU when you're building a computer, in case you decide to expand later, it could turn out to be costly.

Let's say you pay 12p per unit of electricity and your computer components require 250W. Put in a cheap 500W PSU that's only 50 per cent efficient when delivering half its rated load, and the computer will draw 500W from the mains, costing you 6p per hour. Using it eight hours a day, five days a week, will cost £2.40, a total of £124.80 per year. Fit an 80Plus-rated power supply on instead, and the computer will consume no more than 312.5W, equivalent to 2.5 units of electricity per day (30p rather than 48p) for a total cost of £78 per year, saving you £46.80.

Shopping around

While the best PSUs may cost a bit more than the rest – an Enermax 650W 80Plus-rated unit costs around £110, and a similarly efficient Corsair model around £65 – over the lifetime of the computer they pay for themselves, compared with the no-name units you often find included with bargain cases. If a power supply doesn't quote efficiency ratings, it's usually safe to assume it is 'not very'.

Don't forget, too, that efficiency isn't the only thing you need to look at when buying a PSU. Even within a standard such as ATX, there can be differences with the main power connector changing from 20-pin to 24-pin, and the addition of extra connectors for PCI Express cards, Sata drives and the extra power cables needed by some processors and motherboards. When you're planning a new system, ensure the PSU has the appropriate connectors, especially if you're thinking of buying a high-performance graphics card.

Generally, higher-end models will have better quality construction, more connectors and options, often with modular cabling systems, so you can just plug in what you want. The bargain basement units that come with cheap cases may offer nothing more than the motherboard power connector and the usual cluster of captive cables terminated in 4-pin Molex plugs for Pata hard disks. They may also have cheap fans with no thermal controls, making them very noisy.

Whether you're planning to build a new computer from scratch or upgrading an old one, don't assume the PSU supplied with the case is good enough to use. A PSU really is a crucial part of a stable and reliable PC. And with the price of electricity on an upward spiral, treating your computer to a high-quality PSU can be money well spent. **PCW**

PSU standards

Standard PC power supplies should conform to the ATX industry standard to ensure they will fit in an ATX-compliant case and power any ATX-compliant factor motherboard. There are several other form factors available, but ATX is by far the dominant one.

There have been several revisions to the standard, the current version being 2.2. This revision changed the main motherboard power connector from a 20-pin to a 24-pin design. The previous main change was with the move from revision 2.03 to 2.1, when the ATX12V 4-pin connector was added.

There is a wealth of detailed technical information on the ATX and other power supply specifications at **www.formfactors.org**.

Branded for life

While many people are familiar with the main brand names for most PC components, few could name many power supply manufacturers. Some reputable names to look out for are Akasa, Antec, Be Quiet, Coolermaster, Corsair, Enermax, FSP, Gigabyte, Hiper, OCZ, Seasonic, Tagan, Thermaltake and Xilence.

You'll find reviews of power supplies, including their efficiency ratings, by clicking on the link to the Results section of our Test Bed blog at **http://labs.pcw.co.uk**.

There's a list of qualifying PSUs on the 80Plus website – the ones with the gold badge reach 80 per cent efficiency

Power supply monitoring

How do you know how well your power supply is performing? If you want to check if it's producing the appropriate voltages, then the simple solution might be to take a multimeter and measure the output. While that might give you an idea if things are disastrously out of whack – for example, if a 12V line is producing only 10V – it's not the most accurate way of doing things.

Firstly, measuring voltages and other parameters when the PC isn't running under its normal load won't give a true indication of what's going on. And even if you do the measurements when the system is live, a standard multimeter just gives an instantaneous reading. Unless you're looking at it all the time, you won't see fluctuations over time that could be causing problems with the PC, such as a voltage drop as drives spin up or peripherals plugged in to USB and Firewire sockets.

Fortunately, if you suspect there may be issues with your power supply – or with other parts of your system, such as the cooling fans – it's fairly straightforward to find out, thanks to free tools such as CPUID Hardware Monitor (**www.cpuid.com**) and Speedfan (**www.almico.com/speedfan.php**). These tools can both report on the voltages provided by the PSU, as well as the core chip voltage, temperatures and the speed of the fans – and both are free.

There are also specific tools provided by some motherboard manufacturers that might help. Try these at first, as they should be perfectly tailored to your particular motherboard – third-party utilities might not work with some sensor chips.

CPUID Hardware Monitor provides a simple-to-view summary, while Speedfan, despite its name, is the more comprehensive of the two, with additional options that allow you to view information such as the Smart status of the hard disk, or plot temperatures or voltages as a graph. The latter could be handy if you suspect there are problems with your power supply and want to keep an eye on the voltages.

All of this is possible thanks to SMBus, which is a cut-down version of a simple serial bus called I^{2}C, short for Inter-Integrated Circuit. Most modern motherboards support SMBus, and it allows the reporting of basic information; some expansion cards work with it too, and Speedfan should detect all the SMBus devices connected to your system.

But, by its nature, SMBus is very simple – the specification is over a decade old now. Waiting in the wings is a new initiative called ESA, or Enthusiast System Architecture. As its name suggests, it's marketed not so much as a general-purpose system as one put together by and for PC enthusiasts.

Originated by Nvidia, ESA is based on USB and designed to provide lots more information and – crucially – control than SMBus can offer. The initially supported parts of the system include motherboards, cases, power supplies and water cooling systems. Each of the individual parts links to the main board via an internal USB connection, and the exchange of information between them is intended to help optimise performance.

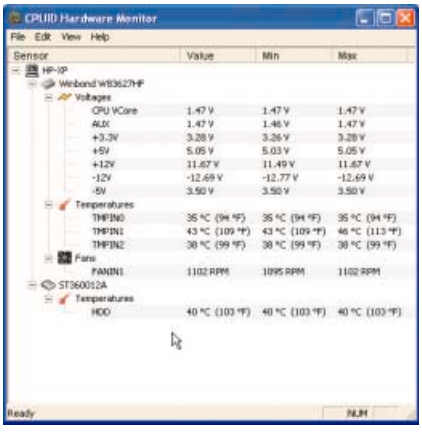
For example, with ESA, if you want to tweak some of the voltage levels for best performance, then the power supply can be requested to deliver the appropriate levels, rather than relying on the motherboard to do the regulation.

There's also better feedback about the operating status of the PSU than is possible via SMBus, and you should be able to save energy by altering the power supply settings based on what the computer is doing.

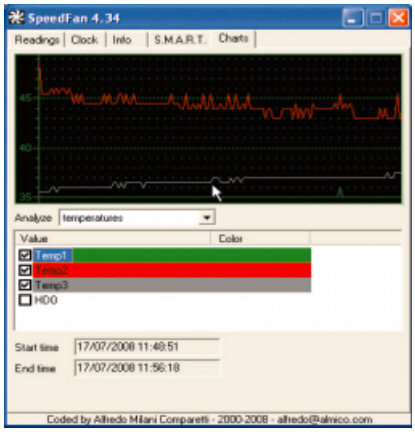
Liquid cooling systems can have their pump speed controlled based on the PC's needs, and there's better feedback to warn of problems. Meanwhile, the case can better control airflow through the fans and display information if it has appropriate LEDs or screens.

While the prospect of better monitoring and control than is presently possible is attractive, so far ESA has made little impact since its launch in 2007, with Nvidia's own site listing fewer than 20 certified products (see **www.nvidia.com/object/nvidia_ esa.html**). It's currently only available on motherboards based on Nvidia's Nforce chipset.

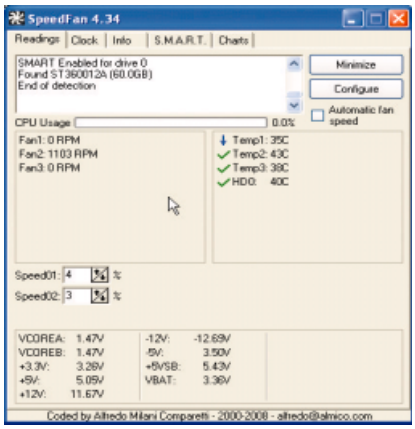
For the time being, at least, it looks as if the best way to keep an eye on your power supply is with traditional SMBus monitoring tools such as Speedfan.



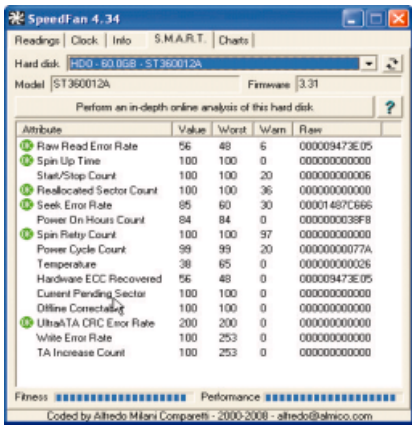
CPUID's Hardware Monitor gives a quick summary of your PC's essential voltage and temperature information



Speedfan can show a graph of temperature or voltage, making it much easier to spot fluctuations over an extended period



Speedfan relies on the established SMBus standard – which most motherboards support – to report data from your PC



As well as providing voltage, fan and temperature data, Speedfan can also read your hard disk's Smart status

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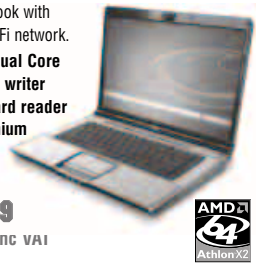

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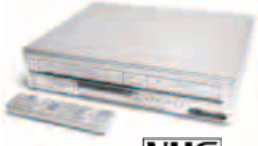
- **15.4" widescreen Ultrabright display**
- **Microsoft Windows Vista and Works 8.5**

Stock status: Factory rework stock
Warranty: 1 year warranty

£229.99 ex VAT **£270.24** inc VAT

FUNAI 160GB/VHS/DVD



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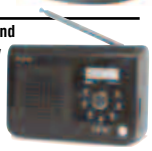

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Warranty: Six month warranty

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- **40W per channel output**
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- **USB socket & SD card slot**

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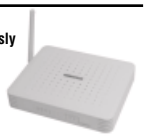
Brand new stock, 1 year warranty

£8.49 ex VAT **£9.98** inc VAT

BELKIN 802.11G WIRELESS ADSL ROUTER



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REVIEWS

The dawn of Centrino 2

Intel's Centrino 2 notebook platform is finally upon us; despite its name it's actually the fifth Centrino chipset. With faster Wifi, DDR3 Ram, beefed up integrated graphics and a new batch of mobile processors, Intel looks set to maintain its hefty lead over rival AMD. However, manufacturers have had a tough time getting their Centrino 2 models to market, with Novatec instead opting to send us an all-in-one desktop PC based on Centrino 2 technology. Read our review on page 56.

We also take a close look at the new iPhone 3G. Web browsing speeds are now in line with the rest of the market, but it still lacks some features that its rivals have had for years. You can now pick one up for free if you sign up to an 18-month contract, but we question whether Apple has done enough to tempt existing owners to upgrade.

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OUR SCORING

Excellent ★★★★★ Very good ★★★★☆ Good ★★★☆☆ Below average ★★☆☆☆ Poor ★☆☆☆☆

OUR AWARDS

Editor's Choice: The best product in a comparative group test. Anything that wins this award is of better quality than its competitors.
Recommended: A product that combines great features, usability and value for money.
Great Value: Not the best in class, but a product that has superior features and performance for the price.
Best Buy: The best product in its class in terms of performance, features and value for money

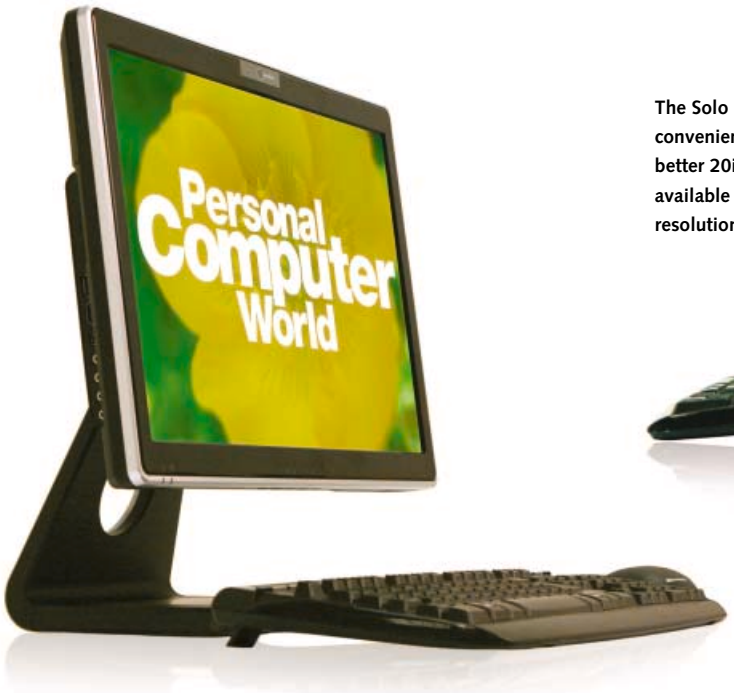
'Thanks to the 3G upgrade, web surfing is now much more pleasurable away from a Wifi hotspot'

Read the review on page 63

DESKTOP PC

Novatech Solo Pro

We give Centrino 2 a test run… in a desktop PC



The Solo Pro is extremely convenient, but there are better 20in monitors available at higher resolutions

Centrino 2 laptops have been devilishly hard to come by since Intel launched the redesign last month. Novatech has, however, fitted the core components of a Centrino 2 laptop into its Solo Pro all-in-one PC. New components include the GM45 chipset, GMA X4500HD integrated graphics and one of the latest Core 2 Duo processors.

Centrino 2's new Draft-N Wifi card (the 450Mbits/sec Wifi Link 5000) doesn't feature in the Solo Pro, which uses Intel's older 300Mbits/sec card. There's also no DDR3 Ram onboard (which Centrino 2 supports), with Novatech instead opting for 2GB 667MHz DDR2 Ram. The Core 2 Duo P8600 beats at the Solo Pro's heart, running at 2.4GHz with 3MB of L2 cache. It's one of five new processors to launch with Centrino 2, featuring a 1,066MHz front side bus. The P at the beginning of its name indicates it has a 25W thermal design point (TDP), rather than the 35W TDP mobile Core 2 Duos usually have.

The P8600 is no faster than previous 2.4GHz Intel mobile CPUs in our PCmark05 CPU test, but was around eight per cent quicker in our Cinebench 9.5 test. The graphics are around 45 per cent faster than Intel's previous X3100 chip in 3Dmark06, which is still a long way off cards from Nvidia and ATI. Centrino 2 machines with DDR3 Ram should have improved graphics performance, due to increased bandwidth.

Centrino 2 laptops with X4500HD graphics are not recommended if you intend to play lots of games, but the X4500HD adds HD hardware decoding. We tested this by installing PowerDVD 8, attaching a Blu-ray drive and watching a Blu-ray film, all with no problems.

It's rather amusing that although this Montevina platform is Intel's fifth-generation chipset to carry a Centrino badge, it has chosen to call it Centrino 2. This can only be seen as an incremental upgrade in terms of performance over Santa Rosa, but with little competition from AMD, Intel still has the fastest and most frugal platform money can buy.

As for Novatech's Solo Pro, it is a 19in monitor with its PC components housed in a thick stand. It features a black and grey paint job, with a DVD-writer built into its right edge and a card reader, 54mm Express Card slot, HDMI, Firewire, USB and audio ports on its right edge. The bottom is difficult to access, but it houses a superb set of connections, including two USB, one Ethernet and an eSata port. The rear-facing speakers, however, sound rather poor.

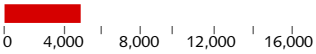
The system drew just 44W when idling – less than half of what most desktop PCs draw and more impressive considering that 19in monitors can draw close to 30W. Power draw increased by just 8W to 9W during Blu-ray playback, so Intel's claims that Centrino 2 laptops can last the duration of a Blu-ray film seem plausible.

All-in-one PCs are extremely convenient, but you have to live with the built-in display for the life of the system, so getting the monitor right is important. The Solo Pro's 19in monitor produced a bright (322cd/m2 in our tests) and contrasty (671:1) picture, but competing all-in-ones (Dell's XPS One and Apple's iMac) feature 20in monitors with higher resolutions. The Solo Pro is £20 more than the cheapest iMac and £180 cheaper than the Dell XPS One, both of which are more stylish and have similar specifications.

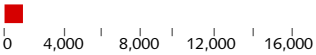
If you're happy to sacrifice the slightly bigger, more detailed monitor on the Dell and Apple in return for great connectivity and lower power consumption, then the Solo Pro is a very good buy. *Emil Larsen*

Performance

PCmark05 **4,869**



3Dmark06* **921**



*Tested at 1,024 x 768 in 32-bit colour

Verdict

Pros 2D performance; compact and attractive; low power consumption
Cons Poor speakers; monitor size; difficult to access some ports
Overall Outstandingly low power consumption and great connectivity.

Features	★★★★☆
Performance	★★★★☆
Value for money	★★★☆☆
Overall	★★★★☆

Price: £821.33

Contact Novatech 0871 222 2812 www.novatech.co.uk
Specifications 19in 1,440x900 LCD • Intel P8600 Core 2 Duo 2.4GHz • 2GB DDR2 667MHz Ram • 250GB Sata II hard disk • Intel GMA X4500 graphics engine • Dual Layer +R/-R/RW DVD burner • 7.1-channel HD audio • Intel GM45 Montevina chipset • Logitech 660 cordless desktop • 4 x USB2 • 1 x Firewire • Gigabit Lan • 802.11a/b/g/ Draft-N Wifi • Bluetooth • HDMI • Card reader • One-year RTB Warranty

NOTEBOOK PC

NEC Versa S9100

A lightweight marvel with solid business credentials, but little glamour

The NEC Versa S9100 is weighs less than the Macbook Air but manages to pack in a DVD writer

Ultraportable notebooks have been given a kick up the innovation backside with the arrival of the Macbook Air. NEC proudly boasts that, despite it including an optical drive (something the Air doesn't), its Versa S9100 weighs 110g less than the Air; on our scales, we measured it in at 1.27kg. That's not a particularly fair comparison though, since the Air has a 13.3in screen while the S9100 has a 12in display.

Its main features include a lightweight magnesium alloy chassis, an LED backlit display to prolong battery life and "self-repairing" paint. This paint is made from numerous glossy layers, which means a new layer of paint will come to the fore if the surface is scratched.

In practice, the piano-black coating is a nice touch but it's on the LCD cover only and scratches and smudges are still visible. The rest of the laptop has to make do with a standard matt-black finish.

The Versa S9100 has a Core 2 Duo U7600 1.2GHz processor, a Santa Rosa chipset, 2GB DDR2 Ram and Intel GMA X3100 integrated graphics. It also includes 1GB Turbo Memory and a 160GB Seagate hard disk with "G-Force protection"; this means the hard drive has a smaller and lighter head as well as increased clearance between the head and disk so it can withstand heavier bumps and bruises without failing.

It scored a reasonable 2,874 in PCmark05, with a respectable 4,532 in the hard drive section. Vista Business comes pre-installed, and it ran very smoothly.

Battery life, courtesy of a mighty 7,800mAh battery and the miserly CPU, was very good, lasting over three hours in our DVD rundown test.

With the arrival of the cheap and frugal Atom processor, it's interesting to see how Intel's premium low-voltage Core 2 Duo U7600 stacks up against it.

The U7600 used here has a 10W TDP (thermal design point), compared to the 2.5W TDP of the 1.6GHz Atom appearing in Acer, Asus and MSI miniature notebooks, but is derived from the more expensive Core 2 architecture. The U7600 is also twice as fast as a 1.6GHz Atom in PCmark05's CPU test. While in intensive single-threaded multimedia applications, which our Cinebench 9.5 single-CPU test exploits, the NEC S9100 managed to score 208 – dwarfing the 90 achieved by the Atom 1.6GHz processor. And when you take into account the Core 2 Duo has two cores while the Atom has only one, the S9100 is two to four times faster across the board.

As such we're comfortable recommending U7600-based systems for users who will be running more than one or two applications at once, while those wanting to surf the net and do basic office tasks will be fine with a low-cost Atom notebook.

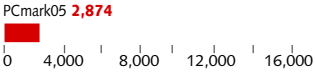
The touchpad on the Versa S9100 is good and the keyboard spacious, although we found the function key sits where the left control key should – something you'll eventually get used to, but it's an irritation.

Ultimately, the S9100 looks rather ordinary alongside its closest competitors, namely the Toshiba Portege R500 and Panasonic Toughbook CF-W7. The Versa S9100 is heavier than the Portege R500, but sturdier too. It's cheaper than the Toughbook, but it doesn't have the same tough-guy credentials or water resistance. The Versa S9100's lack of webcam, pathetic mono speaker and slightly smaller screen makes it less desirable than a Macbook Air.

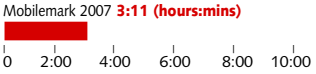
The TMP 1.2 chip and fingerprint reader will endear itself to business users, but otherwise the Versa S9100 doesn't stand out in any way. *Emil Larsen*

Performance

PCmark05 **2,874**



Mobilemark 2007 **3:11 (hours:mins)**



Verdict

Pros Lightweight yet has DVD writer; great security features; battery life

Cons No webcam; mono speaker; bland styling

Overall A lightweight workhorse with more features than a Macbook Air, but none of the glamour

Features	★★★★☆
Performance	★★★★☆
Value for money	★★★☆☆
Overall	★★★☆☆

Price £1,291.32

Contact NEC 0844 894 0165 www.nec-computers.co.uk

Specifications Intel Core 2 Duo U7600 1.2GHz CPU • Intel GM965/ ICH8-M chipsets • 2GB DDR2 Ram • 1GB Turbo Memory • 12in 1,280x800 LCD • 160GB 5,400rpm hard drive • DVD+/-RW DL • PC Card slot • 2 USB2 • SD card reader • VGA • 802.11a/b/g/Draft-N Wifi • Bluetooth • Gigabit Lan • Windows Vista Business • 292x214x30mm (wxdxh) • One-year C&R warranty

NOTEBOOK PC

Advent 4211

A rebranded MSI Wind with a scrumptious price and excellent usability

The Advent 4211 sports Intel's new Atom N270 processor, making for an exceptionally quiet-running machine

This is the MSI Wind. Well, not exactly – the MSI Wind review can be found in our £499 group test on page 100, but the Advent 4211 is identical in terms of hardware.

In a nutshell, MSI has sold its design to PC World, where it gets a different paint job, no carry case, and a one-year, rather than two-year, warranty. By stripping out the case and warranty, the Advent 4211 is £50 cheaper than the MSI Wind's suggested retail price and £60–£95 cheaper than the price the Wind is actually selling for, due to short supply.

Both the Wind and Advent 4211 sport Intel's new Atom N270 processor, running at 1.6GHz with 512KB L2 cache. It has low energy requirements and produces little heat, so the Advent 4211 is exceptionally quiet.

This is our first opportunity to benchmark the Atom in depth, since the Atom-based Acer Aspire One and Asus Eee PC 901 we reviewed last month didn't have Windows-compatible drivers.

It's a single-core CPU with the first outing of hyperthreading since the Pentium 4. It produced a PCmark05 CPU score of 1,499 and Cinebench 9.5 scores of 135 with hyperthreading enabled (90 without). On the Pentium 4, hyperthreading boosted performance by around 10 per cent in a handful of applications, but the Atom result shows Intel has made huge strides with its virtual multithreading technology.

However, despite the impressive hyperthreading increase, the 1.6GHz Atom is just two per cent quicker than the 900MHz Celeron M 353 in PCmark05 and 25 per cent slower in non-hyperthreaded applications like our single-CPU Cinebench test.

There's also 1GB DDR2 Ram, an 80GB 5,400rpm hard drive and Intel GMA 950 integrated graphics. Its 10in screen is pleasant to use, with a decent 1,024x600 resolution that only kicks up a fuss when used with programs requiring 768 horizontal lines. That said, HP's Mininote 2133 is the only small laptop with a higher resolution.

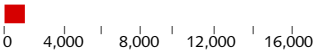
It may be worth skipping the Advent 4211 and MSI Wind altogether if you're planning on plugging it into a projector or external screen (for presentations and the like), because they simply wouldn't output some 4:3 aspect ratio resolutions, including 1,024x768. MSI let us preview an upcoming Bios update that fixes the issue, but upgrading the Bios is an ugly affair because there's no Windows or in-built Bios tool.

Both the MSI Wind and Advent 4211 come with an 'eco' utility installed, which limits the CPU to its Speed-Stepped clock of 700MHz and reduces screen brightness when running on batteries. With the screen brightness set to full and Wifi turned off, both the MSI Wind and Advent 4211 lasted two hours 10 minutes in our reader test, which is 40 minutes less than the Eee PC 900 and around two and a half hours less than the Eee PC 901. The cause is the small 2,200mAh battery – to propel this laptop to a more acceptable battery life, MSI's extended 5,200mAh battery (available to buy at the end of August for £69) is an essential purchase.

We've done a lot of nitpicking on both the MSI Wind and Advent 4211 but, with the exception of battery life, both are nicer to use than the Asus Eee PC and Acer Aspire One. The keyboard is much larger and more comfortable, in particular the impressive double-height return key. But we can only recommend the Advent 4211 since it's cheap enough for you to buy a second battery, and decent battery life is something all Atom-based laptops deserve. *Emil Larsen*

Performance

PCmark05 **1,499**



Battery life **2hrs 10mins**

Verdict

Pros Pleasant screen; very good keyboard; light; affordable

Cons Poor battery life; some external resolution problems; no case included

Overall An excellent keyboard and much better value for money compared to the MSI Wind

Features	★★★★★
Performance	★★★☆☆
Value for money	★★★★☆
Overall	★★★★☆

Price £279.99

Contact PC World

Specifications Intel Atom 1.6GHz N270 CPU • 1GB DDR2 Ram • 10in 1,024x600 screen • 80GB 5,400rpm hard drive • Intel GMA 950 graphics • 3-in-1 card reader • Webcam • 2,200mAh battery • 802.11b/g Wifi • Bluetooth • 10/100 Ethernet • Windows XP Home • 259x179x38 (wxdxh) • 1.16kg excluding power adapter • 1.50kg (1.16kg excluding power adapter) • One-year RTB warranty

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DESKTOP PC

Mesh Elite IQ 2180

Basic price, with decent performance

The 19in Hanspree monitor currently supplied may be changed over the coming weeks

Opening up a desktop PC and inspecting the internals gives a few clues as to how much care and attention has gone into the making of the machine. It's hard to level any criticisms relating to tidiness on the Mesh Elite IQ 2180 since there are so few wires inside – this also means there's plenty of room for air circulation, so overheating isn't a problem.

The power supply offers a modest 300W, with only a few power connectors. Still, that's enough to power the multiformat DVD writer and the 250GB hard disk. The other chief power-drawing components are the Intel Pentium E2180 dual-core processor, clocked at 2GHz (along with 4GB of system memory), and the Nvidia Geforce 8400GS graphics card (which has 256MB of its own memory). That makes for a middling computer.

It's not slow by any means, but neither does it have much kick to it. It came out with a Windows Experience Index score of only 3.7 (this is dragged down by the graphics performance), while in our benchmarks it clocked up 4,882 in PCmark05 and 3,274 in 3Dmark05, neither of which will set the world alight.

All that said, though, the price of the Mesh Elite IQ 2180 is its real stand-out feature – at under £400 it represents excellent value for users who don't need high-power performance but who also want a computer that will last. The generous 4GB of memory means it's going to be happy running multiple programs, and the processor is likewise capable, even if, for the hardcore applications such as games and video editing, the IQ 2180 will struggle.

Expansion potential is limited; there's a single 5.25in external drive bay – should you wish to add a Blu-ray drive at some point in the future, for instance – as well as a single internal 3.5in bay for another hard disk (the 250GB included is not miserly but it's the sort of capacity we're starting to see regularly in notebooks).

There are only two memory slots on the cut-down size Asus P5N-MX motherboard, both of which are taken in this configuration, but then Vista (the 32-bit edition of Vista Home Premium is supplied) can't really do much more than that anyway, so it's a moot point.

Again, though, the type of user who doesn't need raw processing horsepower is the same type who won't want to install lots of extra disks either. There is one free PCI slot (actually, there are two, but one is pretty much obscured by the overhang from the graphics card fan) and a x1 PCI Express slot.

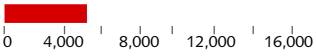
There are a few frills. A multiformat memory card reader occupies one of the front bays, along with four USB ports and headphone and microphone sockets. On the back, in addition to the VGA and DVI sockets on the graphics card, are four more USB sockets, parallel and serial ports, keyboard and mouse ports and an Ethernet connection. Supplied with Windows Vista Home Premium are Microsoft Works 8.5 and a video-editing suite from Cyberlink (including PowerDVD and Powerdirector), as well as a 2GB USB key and Creative webcam and headset combo.

Mesh supplied a rather unusual looking 19in Hanspree monitor with our review system; however, it advised us that the monitor may change over the coming weeks so we recommend you ask which monitor you'll receive before parting with your cash. A Logitech keyboard and mouse completes the package.

The Mesh Elite IQ 2180 won't set your heart racing, but at this price you wouldn't expect it to. Instead, you get a solid PC that would suit general day-to-day usage. *Anthony Dhanendran*

Performance

PCmark05 **4,882**



3Dmark05* **3,274**

*Tested at 1,024 x 768 in 32-bit colour

Verdict

Pros Very cheap; tidy internals
Cons Little expansion capability; poor graphics performance
Overall A very good PC for undemanding users, but anyone looking for more power or expansion potential should look elsewhere

Features	★★☆☆☆
Performance	★★★★☆
Value for money	★★★★★
Overall	★★★☆☆

Price £389.99

Contact Mesh 08447 36 04 40 www.meshcomputers.com
Specifications Intel Pentium E2180 (2GHz) • 250W PSU • 4GB DDR2 Ram (667MHz) • 250GB hard disk • 20x dual-layer DVD writer • Nvidia Geforce 8400GS • 19in LCD monitor • Logitech keyboard and mouse • Windows Vista Home Premium/SP1 • Microsoft Works 8.5 • One-year RTB warranty

DESKTOP PC

Arbico Elite 4870 Xfire

ATI's Crossfire technology gives Nvidia's SLI a run for its money

Crossfire, the dual-graphics card technology from AMD's graphics arm, ATI, hasn't had the best of times in recent years. Despite its complete monopoly on Intel's chipsets (SLI only works on Nvidia's chipsets) and AMD working furiously on the drivers to allow four graphics cards to work together, SLI has had the biggest market share by far.

The reason is that until the Radeon HD 4800 series of graphics cards, AMD's performance has lagged behind Nvidia's. AMD has made big strides though and today a Radeon HD 4850 beats an Nvidia Geforce 9800GTX in most scenarios and a Radeon HD 4870 competes comfortably with the Nvidia Geforce GTX 260, the slightly less powerful of the two wonder cards in Nvidia's new GTX 200 series.

Arbico has put two Radeon HD 4870s in this PC, each with 512MB of GDDR5 Ram ticking over at a terrifically fast pace of 3.6GHz.

You need a fast CPU to keep such powerful graphics cards fed, so Arbico has fitted a Core 2 Quad Q9450 processor with 12MB L2 cache. By default, it runs at 2.66GHz, but Arbico has pushed the front side bus from 1,333MHz to 1,800MHz (with a 0.1V bump to 1.26V) so that the processor runs at 3.6GHz. Despite this big increase, the CPU temperature remained at 37°C after two days' usage.

Other components include 4GB OCZ Ram clocked at 900MHz (synchronised with the FSB), a Creative X-Fi Xtreme Gamer sound card and a Gigabyte X48 motherboard that provides astounding connectivity, including eight USB ports, two Firewire, two Gigabit Ethernet ports and two spare x1 PCI Express slots, so you could add both a TV tuner and Wifi card.

Vista Home Premium comes installed on a Super Talent 64GB solid state drive (SSD), while a second 500GB hard drive is provided for extra storage.

We were slightly disappointed with the performance of the Super Talent SSD. It only managed 7,210 in PCmark05 on our hard disk testing rig, which is 20 per cent slower than Western Digital's 300GB Velociraptor hard drive.

Sequential read and write speeds are the Achilles heel of SSDs, although the difference is small with the Super Talent drive and it shined in our random access test, fetching data in just 0.5ms compared with 9ms on most mechanical hard drives. The restrictive amount of free space on the SSD is also problematic because you would have to install applications on it to take advantage of its quick access times.

Gaming on this PC is, for the most part, awesome. Arbico has bundled a 24in Samsung 245B monitor (not pictured), with an all-important 1,920x1,200 pixel resolution. Games look fantastic, however, on closer inspection our benchmarks threw up some odd numbers. A 3Dmark06 score of 20,297 is superb, as is the PCmark05 score of 13,696 (11,523 in the CPU section) and at 1,920x1,200, World in Conflict played through at 57fps (frames per second) with high settings, but the game occasionally stuttered, producing just 3fps. Crysis, on the other hand, didn't suffer from such stutters and looked fantastic, producing 28.55fps on high settings. But when we disabled one of the cards, the average frame rate increased to 31.76fps, proving that the drivers need serious work to distribute the work between the cards more efficiently.

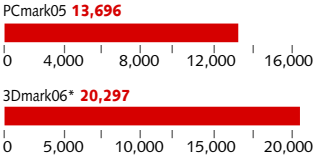
Our misgivings about the PC don't end there. Although the Xfire is generally a quiet system, the fans in the graphics cards occasionally spin up to an alarming rate for a second or two, then drop back down. Then there's the 2.5in Super Talent drive, which is attached to a 3.5in bay using cable ties so it's difficult to remove. Power consumption is also on the high side, idling at 300W and peaking at 434W – we reckon Nvidia's competing dual-SLI based systems have the edge as far as idle energy efficiency is concerned.

A £2,000 PC might sound like a lot, but considering the high calibre case and components, its top-notch 24in monitor and the fact you would struggle to buy the separate components and save any money, it's excellent value for money. Our biggest concern is the SSD isn't appropriate for a desktop and the second graphics card goes to waste on games where Nvidia's SLI is more efficient.

Emil Larsen

The Arbico Elite 4870 Xfire is powerful but has some minor flaws

Performance



*Tested at 1,024x768 in 32-bit colour

Verdict

Pros Extremely fast; quiet overall; outstanding connectivity

Cons Crossfire scaling problematic; high idle power draw; occasional noise outburst from graphics cards

Overall Arbico's Elite 4870 Xfire is a delight to play most games on, but the graphics drivers need improving for it to reach its full potential

Features	★★★☆☆
Performance	★★★★☆
Value for money	★★★★★
Overall	★★★★☆

Price £1,999

Contact: Arbico 08456 25 26 27 www.arbico.co.uk

Specifications Intel Core 2 Quad Q9450 CPU 3.6GHz • 4GB PC8500 1066Mhz DDR2 Ram • 64GB SSD 500GB hard drive • 24in Samsung SM245B monitor • Gigabyte GA-X48-DQ6 motherboard • Two ATI HD4870 512MB graphics cards • Blu-ray/HD DVD reader • 22x Samsung DVD+/-RW DL • Logitech Cordless 1500 rechargeable desktop • Cyber Acoustic 5.1 Surround Sound Speakers • Windows Vista Home Premium • Two-year RTB warranty

SMARTPHONE

Apple iPhone 3G

A significant upgrade, but several flaws still remain

The caption "The iPhone you've been waiting for" on Apple's website says it all. The fact is, despite its revolutionary interface and outstanding ease of use, the original iPhone lacked some pretty crucial features, tied you into an 18-month contract and cost £269.

Now, after much speculation, Apple has released the iPhone 3G. We won't revisit all the features of the original model in this review (read our first-gen iPhone review at **www.pcw.co.uk/2203375**), but as the name suggests this model features 3G (including HSDPA). There's also no charge for the phone if you sign up to a £30 per month contract, although once again it requires a minimum 18-month contract.

Thanks to the 3G upgrade, web surfing is now much more pleasurable away from a Wifi hotspot – in our tests we averaged just under 700Kbits/sec – and navigating via the Safari browser by making pinching and stretching gestures with your fingers on screen is just as impressive as before. Websites appear just as they do on a PC or Mac, although this does mean you frequently have to zoom in to make text legible and Flash content isn't supported.

Apple has made some changes to the physical design, most noticeably the slightly curved rear. It's also very slightly thicker and heavier. The screen stays at 3.5in with a resolution of 480x320 pixels and the 802.11b/g wireless from the original is also present. And although Bluetooth is built-in, it still doesn't support the A2DP format used by wireless stereo headsets. A small but useful change in the design is that the 3.5mm headphone jack is no longer recessed, allowing you to use your own set of headphones instead of Apple's trademark white buds that come with the package. Those wanting to replace their 40GB iPod with an iPhone will be saddened to hear it's only available in 8GB and 16GB versions.

As before, Google Maps comes preinstalled, but thanks to the built-in GPS receiver it can now pinpoint your location; the assisted-GPS mode uses nearby mobile telephone masts to give a rough indication of where you are until overhead satellites are located. But with no turn-by-turn directions or voice instructions, it's no replacement for a sat nav. Those interested in GPS will have to use it sparingly or risk draining the already under-strain battery in less than a day. Even if you steer well clear of the GPS function, you'll most likely have to charge the phone on a daily basis if you indulge in a fair amount of web surfing and listening to music. With very light usage we managed just over three days.

Apple has seen sense and opened the iPhone up to third-party software developers, although you'll only be able to download them via Apple's App Store. Unsurprisingly, developers have been keen to get their own piece of iPhone action with around 500 titles already available. Games such as Texas Hold'em and Crash Bandicoot top the download charts, but there's a wide range of downloads available including education software, business tools and ebooks.

The 3G iPhone is available in 8GB and 16GB versions

The fact the two-megapixel camera hasn't been given an upgrade will disappoint many, and the continued lack of a flash, LED or otherwise, means it's not much good in low-light environments. Perhaps more of a surprise is that Apple has chosen not to install a second, front-facing camera – despite widespread 3G coverage video calling has failed to take off in the UK, but the iPhone is surely the device that could change all that.

There's no doubt the iPhone 3G makes some significant improvements over the original, but although it trounces the competition in terms of ease of use it still omits features found on its competitors. Video recording, MMS messaging and a removable battery are all shunned by the iPhone.

Available for free on contract, the iPhone is bound to attract new customers, but we don't think Apple has done enough to tempt existing owners to upgrade. Clearly those who want to do plenty of web surfing will be tempted by 3G, but there's very little else to prompt an upgrade. And while the GPS module is a bonus, it's no replacement for a dedicated sat nav.

The iPhone is still by far the easiest to use smartphone currently available, but it's not quite the upgrade we were hoping for. *Will Stapley*

Verdict

Pros Faster browsing; built-in GPS; usability; stylish

Cons Can't render Flash content; no video recording or MMS; poor battery life

Overall Several flaws remain, but the new pricing structure and 3G makes the iPhone much more appealing and its usability is second to none

Features	★★★★☆
Performance	★★★★☆
Value for money	★★★★☆
Overall	★★★★☆

Price From free (depending on contract)

Contact Apple 0800 048 0408 www.apple.com/uk

Specifications 3.5in display (480x320) • 3G (HSDPA) • Two-megapixel camera • Wifi (802.11b/g) • Bluetooth • 8/16GB flash memory • 3.5mm headphone jack (headset included) • Dock and USB power adapter included • 62.1x12.3x115.5mm (wxdxh) • 133g

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intel Core 2 Duo inside

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GRAPHICS CARD

Sapphire Radeon HD4870

Top-end performance at a mid-range price

This graphics card from Sapphire is the first we've seen that uses AMD's latest version of the RV770 GPU, namely the HD4870.

The GPU's architecture is very similar to the HD4850 we reviewed last month; the cores are 55nm, have 965 million transistors, 800 stream processors and 40 texture units. The core speed of the HD4870 has risen from the 625MHz of the HD4850 up to 750MHz, but the biggest change is in the memory. The 512MB of Ram memory runs at 900MHz, but thanks to it being GDDR5 memory, the effective frequency is 3.6GHz at just 1.5V.

Using GDDR5 memory has also allowed AMD to fit a smaller 256-bit memory bus without any impact on memory bandwidth, as GDDR5 offers around twice the bandwidth of GDDR3/4. In the case of the HD4870, that works out to a massive 115Gbits/sec.

The performance of the HD4870 is very good when you consider it's essentially a mainstream card. At a resolution of 1,280x1,024, it produced a 3Dmark06 score of 16,965, while in Crysis with all details set to high it produced a very playable score of 53.54fps. To give an idea of the rendering potential of the card, this only drops to 46fps when 4x anti-aliasing and 4x antroscopic filtering are turned on.

Rated at 160W, it's good to see that the HD4870 uses two 6-pin PCI-E power connectors instead of opting for an 8-pin version, which you will only find on the latest PSUs. Sapphire includes two Molex-to-6-pin connectors in the box just in case your power supply doesn't have the necessary connectors.

Unlike its smaller sibling, the first crop of HD4870 cards use a twin-slot cooling solution, but further along the line we should see some companies offering alternative cooling designs. *Simon Crisp*

Verdict

Pros Performance; relatively low price
Cons Cooling fan a little noisy at startup
Overall Fast performance, but without the high price tag

Features	★★★★☆
Performance	★★★★☆
Value for money	★★★★★
Overall	★★★★☆

Price £181.76
Contact Sapphire 08701 228 310 www.sapphiretech.com
Specifications RV770 GPU • 512MB GDDR5 Ram • 750MHz core • 900MHz memory (3.6GHz effective) • Shader Model 4.1 support • Dual-slot cooling design • Two dual-link DVI ports • HDMI output via supplied dongle

GRAPHICS CARD

Zotac Geforce GTX 280 AMP Edition

Supremely fast, but with a price to match

Nvidia's GT200 is its second-generation DirectX10 graphics core following on from the highly successful G80. At present, there are just two flavours: the GTX 260 and the flagship GTX280, which is what this Zotac card is based on.

Rather than a totally new design, the new core has improved and added to the G80's architecture, doubling the processing power in the process. It also houses a colossal 1.4 billion transistors. As standard, the GTX 280 has 240 stream processors clocked at 1,296MHz, a core running at 602GHz and 1GB of GDDR3 memory clocked at 1.1GHz (2.21GHz effective) running via a 512-bit memory interface, which gives a hefty bandwidth of 141.7Gbits/sec.

However, the AMP Edition moniker indicates this model is from Zotac's overclocked range. All three clocks have been tinkered, so the core runs at 700MHz, the shader at 1,400MHz and the memory at 2.3GHz.

A dual-slot cooler dissipates heat and covers the entire PCB of the card. Nvidia quotes the maximum rated power at 236W; it features a single 6-pin power connector alongside an 8-pin version. The board also supports Nvidia's Hybrid Power technology, allowing compatible motherboards to switch to integrated graphics to save power during non-graphically intensive applications.

As for performance, Zotac's version of the GTX280 is the fastest single core graphics card we've tested. At 1,280x1,024, it produced a 3Dmark06 score of 13,264, while Crysis returned a frame rate of 53fps at 1,280x1,024 with 4x anti-aliasing and 4x anisotropic filtering with all details set to high. Even at 1,600x1,200 with the same filtering, it managed an amazingly impressive 43fps.

If you're after top-end performance and don't mind paying the price, this is the card for you. *Simon Crisp*

Verdict

Pros Top-end performance; overclocked
Cons Two-slot cooling design; expensive
Overall Zotac's overclocked GTX280 is the fastest card we've tested, but it's only for those with deep pockets

Features	★★★★☆
Performance	★★★★★
Value for money	★★★☆☆
Overall	★★★★☆

Price £366.27
Contact Zotac 08701 228 303 www.zotac.com
Specifications Nvidia GXT280 GPU • 1GB GDDR3 • 700MHz core • 2.3GHz memory • Two dual-link DVI ports • Two-slot cooling design • Nvidia Hybrid Power-compatible

DIGITAL CAMERA

Sanyo Xacti DMX-CA8

An eight-megapixel camera that's waterproof to 1.5m

Taking photos underwater or on the ski slopes often requires a separate water-tight housing for your digital camera. Sanyo's Xacti DMX-CA8 is, however, built from the ground up to be waterproof to a depth of 1.5m for 60 minutes.

The DMX-CA8 hides its waterproofing features well, with rubber padding sealing the battery, USB and SD compartment. It withstood our informal testing comfortably. Its pistol-grip design presents an array of easy-to-use buttons and the menu system is intuitive, presenting many interesting options including 10-shot burst and webcam modes.

At its core, the DMX-CA8 uses an eight-megapixel Cmos sensor for photos and a high bitrate (6Mbits/sec) 60fps (frames per second) VGA video mode. The lens is 38mm equivalent, which is very narrow, leaving photos looking noticeably more restrictive than most cameras with a 35mm lens. However, if you're interested in zooming in on objects in the distance the Xacti's narrow angle lens and 5x optical zoom is fine.

For picture quality, we tested the Sanyo Xacti against a two-year-old Canon Ixus 60 compact digital camera, which produces reasonable picture quality and can still be bought for £100. When focusing on objects less than 1m away, there was also considerable convex lens distortion and the Xacti looked blurry, darker and even blocky in places compared with the old Canon – in fact the Xacti produces some of the worst photos we've seen from an eight-megapixel camera.

Worse still, video quality on the highest setting was noisy and compression artefacts visible. We blame Sanyo's choice of Cmos sensor and lens, which leaves you paying a rather a lot for the Xacti's compact and waterproof chassis. Ultimately it's an impressive design that's let down by poor performance. *Emil Larsen*

Verdict

Pros Works well under water; lots of modes; compact and attractive
Cons Narrow angle lens; convex lens distortion; poor picture and video quality
Overall An attractive camera for outdoors and underwater enthusiasts, but it takes ugly photos and videos

Features	★★★★☆
Performance	★☆☆☆☆
Value for money	★★★☆☆
Overall	★★★☆☆

Price £249.99
Contact Sanyo 01923 246 363 www.sanyo.co.uk
Specifications eight-megapixel Cmos sensor • 5x optical zoom • 640x480 (VGA) 60 fps 6mbit/sec AVC/H.264 video • SD HC card support • 2.5in LCD • 44MB inbuilt display • 48KHz stereo audio • USB2 • Composite video • Adobe Premiere Elements 4.0 • Adobe Photoshop Album Starter Edition

PORTABLE MEDIA PLAYER

Sandisk Sansa Fuze

Can this recent addition to the Sansa range challenge Apple's Nano?

There's little doubt Sandisk is pitching the Sansa Fuze as a direct competitor to iPod Nano. Although around twice as thick, its height and width are similar to Apple's player, however, its black plastic and soft rubber chassis can't match the style of the Nano's chrome casing.

The player has a 1.9in display and the overall build quality is solid. Capacities range from 2GB to 8GB, though, like the Sansa View, it also offers a Micro SD slot for memory expansion.

The player connects using a proprietary port at the bottom which looks very similar to the iPod interface; unsurprisingly, it's not compatible with iPod cables. You can copy music and photos via drag-and-drop, but to make video content viewable you will need to download Sansa's Media Converter software to encode and copy on the fly. This doesn't appear to have changed much, but it does perform a bit faster than before; in tests it processed a 100MB file in around five minutes with a reduction in size of around 25 per cent. It's still not an ideal scenario though, and it's a shame format support isn't better.

The interface hasn't really changed since the original Sansa e-series of players, though we did notice that it's a little smoother and more responsive. The display is decent enough without being outstanding, and while playback quality is reasonable the 1.9in screen means you won't want to watch long movies.

With a customisable equaliser, audio quality is also good, though you'll need to replace the headphones supplied. You will also find an FM radio and voice recorder, with the two able to work together to copy broadcast content direct to the player.

The features, quality and usability of the Fuze aren't radically different to other players in the series, but the small size, expandability and low price make it a decent choice. *Paul Lester*

Verdict

Pros Compact design; good value for money; expandable memory
Cons Audio and video performance could be better; rather basic operation
Overall Lacks the glitz and glamour of the Nano, but its value for money and capacity mean it's still a terrific player

Features	★★★★☆
Performance	★★★☆☆
Value for money	★★★★☆
Overall	★★★★☆

Price £69.99 (2GB), £79.99 (4GB), £99.99 (8GB)
Contact Sandisk 020 7365 4193 http://uk.sandisk.com
Specifications 1.9in display (220x176) • 2GB/4GB/8GB • Micro SD card slot • Audio support: MP3, WAV, WMA (DRM), Audible • Video support: MPEG-4 • Image support: JPEG • 24 hours battery life (audio), five hours (video) • 50x7x78mm (wxdxh) • 60g

CONVERT VHS TO DVD
See feature on page 29

USB VCR

Ion VCR 2 PC

Digitise your VHS videos at the touch of a button

One of the drawbacks associated with converting old VHS tapes to digital video is the number of cables involved. The Ion VCR 2 PC, available from Firebox.com, is a VHS VCR that cleverly integrates the capture hardware, so all you need to do is plug it into a spare USB port on you PC. It's the video equivalent of USB turntables for digitising your vinyl albums (read a review of Ion's USB Turntable at **www.pcw.co.uk/2168920**).

In operation, it really is that simple. Once the drivers and capture software are installed, all you need to do is insert a tape and press play. The hardware ships with Arcsoft EZ VHS capture software which, in fairness, wasn't EZ at all. Instead of pop-up menus, selecting from multiple options involves clicking nudge buttons to scroll through a list.

Selecting the PAL-I video option from the numerous alternatives using this method takes forever, as does making any other software choice.

Thankfully, once set up, there's little to do other than press the record button. The software can then burn your captured footage direct to DVD.

There's a Scart output socket on the back of the VCR, so you could connect a TV and use it as a conventional VHS deck, though that would probably defeat the object. You can also connect other input devices, your analogue camcorder for example, via a composite video socket on the front.

If Ion could find software to match the simplicity and functionality of the hardware, this product would deserve to be a runaway success. But, even though the software took the edge off the experience, the VCR 2 PC remains one of the simplest and most effective ways of transferring your old VHS home recordings to DVD before they are lost forever. *Ken McMahon*

Verdict

Pros Simple; everything you need, including the VCR; only one cable
Cons Dire capture software; only one codec option
Overall Despite the software, a great idea that works well

Features ★★★★☆
Performance ★★★★★
Value for money ★★★☆☆

Overall ★★★★☆

Price £149.95
Contact Firebox www.firebox.com
Specifications USB2 port (USB cable included) • Composite and analogue audio inputs • Scart output • EZ VHS Converter software • Windows XP/Vista compatible • 370x241x84mm (wxdxh)

DIGITAL CAMERA

Samsung NV24HD

A powerful pocket camera with HD video recording

Samsung's NV cameras all look and feel very similar, with only relatively minor cosmetic differences apparent from the outside. Cameras of this size can't compete with those with bigger sensors and lenses, but the NV24HD has overcome some of the image noise problems found in early NV models and produces decent images.

However, the true benefits of this camera are in its ability to capture great shots with minimal user effort. The 24mm wide-angle lens is ideal for shooting landscapes, but portraits get even more of a boost by using enhanced face detection technology to create new scene modes. The camera can also detect when your subject is blinking and will automatically take two extra shots to ensure you capture them with their eyes open.

In the new Smile Shot mode the camera detects your subjects' faces, waiting until they crack a smile at which time a picture is taken automatically – you don't even need to click the shutter. The camera will also help you avoid cutting yourself out of self portraits by beeping when your face is correctly framed within the image. These features all worked well during testing and produced decent photos we would have otherwise missed out on.

The NV24HD's video shooting modes extend up to 720p resolution which gives you 1,280x720 pixel, widescreen video that can be played back directly on your HD-Ready TV via the supplied HDMI cable. These movies are saved in the high quality, yet highly compressed, H.264 format, which does require a bit of oomph from your PC – a 3.2GHz processor and Geforce 7600GT or Radeon X1600 higher is recommended.

At £249 the NV24HD is a little pricey, but shop around and you'll find this model for about £100 less, which is a great deal on such a sophisticated and well-made camera. *Paul Monckton*

Personal Computer World RECOMMENDED

Verdict

Pros 720p movie recording; excellent build-quality; 24mm zoom lens; smile and blink detection
Cons Recorded audio quality; small sensor size; narrow zoom range
Overall The NV24HD is an impressive camera, packed with features that will help you take better pictures – the HD video recording is a welcome bonus

Features ★★★★★
Performance ★★★★☆
Value for money ★★★★☆

Overall ★★★★☆

Price £249
Contact Samsung www.samsungcamera.com
Specifications 1/2.3in sensor • 10.2-megapixels • 24mm-86.5mm lens (35mm equivalent) • F2.8-5.9 • 720p movie recording (H.264) • 2.5in monitor • 8-1/2,000sec exposure • ISO 80 – 3200 • SDHD card support • 98.5x19x61mm (wxdxh) • 145.5g

30IN TFT

NEC Multisync LCD3090WQXi

Astonishing level of features combined with superb build quality

When testing TFTs, we use a hardware calibrator to evaluate the range and accuracy of displayed colour. The calibration process uses the PC's graphics card to correct inaccuracies in the monitor, usually producing a difference in the appearance of graphics on screen.

The LCD3090WQXi showed virtually no change before and after calibration because it's spot on to start with. The display allows you to plug a hardware calibrator (not supplied) into a special port. An on-screen menu pops up automatically and takes you through the process without the need for an attached PC. This method of calibration, combined with enhanced 12-bit colour look-up tables, achieves a higher level of accuracy and produces smoother colours with no banding. A wide colour gamut allows the display of colours impossible on lesser displays.

We've seen other displays that can do this, including low-cost TN-based products, but without the level of colour accuracy of the LCD3090WQXi's IPS panel these displays are often more trouble than they're worth.

The fully adjustable stand is very robust and solidly built. It has a 190mm height adjustment and can rotate into landscape mode.

NEC's on-screen menu is also easy to use, despite the huge number of options within it. Button functions are displayed directly above the buttons themselves, eliminating any confusion as to their function. This is especially important considering 30in displays hardly ever have an on-screen menu.

If you work with colour-critical applications, want to match on-screen images to a printer or simply want the best-looking display possible then you can't do much better than the LCD3090WQXi. *Paul Monckton*

Verdict

Pros Amazingly good image quality; self-calibration; ambient light sensor; build quality

Cons Price; no USB ports

Overall An expensive, but utterly superb monitor with phenomenal colour reproduction

Features	★★★★★
Performance	★★★★★
Value for money	★★★★☆
Overall	★★★★★

Price £1,741

Contact NEC 020 8993 8111 www.neceurope.com

Specifications 30in S-IPS panel • 2,560x1,600 pixel resolution • Built-in backlight sensor • Ambient light sensor • 12-bit internal LUT • Black level adjustment • DVI-D and DVI-I input • HDCP support • 350 cd/m² brightness • 1,000:1 contrast ratio • 178° Viewing angles • 6ms response time (grey-to-grey) • 687x343x 479mm (wxdxh) • 19.1kg • Three-year warranty

DIGITAL SLR

Olympus E-420

'World's smallest' digital SLR gets a revamp

A year after the release of the Olympus E-410 comes the company's new entry-level model, the E-420. At first, the two 10-megapixel digital SLRs look identical, save for a raised ridge on the E-420's grip, which affords a firmer hold. The lack of a true grip on its equally compact predecessor was disappointing, so this is a step forward.

At the back of the E-420 is a 2.7in screen, up from the 2.5in of the E-410, although resolution remains the same, so you won't see any more detail.

Dual memory card slots (it can accept both Compact Flash and XD cards) are still present, as is a live view that allows the rear screen to be used for composing shots.

When switched on, the camera shakes its sensor free of dust but, unlike the E-520, there's no built-in image stabilisation to counteract wobbling hands and avoid blurred images when shooting in low light.

The E-420's processor allows for a faster shooting speed of 3.5 frames per second and its Shadow Adjustment technology adjusts tricky exposures, which maintains detail in both light and shade.

Despite its busy control layout, the E-420 is easy to use. Light sensitivity is limited to a maximum of ISO1600, but whereas many rivals would display a destructive amount of image grain at this setting, the E-420 delivers impressively clear shots. Colours are realistic too, with the option of a more vivid setting.

Mysteriously, the E-420 has lost two scene modes, but as these were for shooting underwater, most users won't grumble.

Incidentally, in tandem with the E-420 comes a new compact 50mm equivalent portrait lens, its 'pancake' construction helping to reduce the size and weight of this DSLR when you're on the move. *Gavin Stoker*

Verdict

Pros Good low-light performance; decent build quality; easy to use

Cons A couple of scene modes dropped from E-410

Overall Impressive build quality in an easy-to-use digital SLR that performs extremely well

Features	★★★★★
Performance	★★★★☆
Value for money	★★★★★
Overall	★★★★★

Price: £330 (body only)

Contact Olympus 0800 072 0070 www.olympus.co.uk

Specifications 10-megapixel CCD • Four Thirds lens mount • ISO 100-1600 • 60-1/4000sec shutter speeds • 2.7in monitor • JPEG and Raw capture • Compact Flash and Xd Picturecard • 129.5x53x91mm (wxdxh) • 380g

MULTIFUNCTION DEVICE

Lexmark X4650

A slick new design, but ever so similar to its vastly cheaper predecessor

Despite the popularity of wireless networks, Lexmark appears to be the only manufacturer pushing wireless printers. The X4650 is the latest and takes the form of an MFD, providing printing, scanning and copy functions. Lexmark has gone for an all-black colour scheme as opposed to the usual beige, along with a slanted front to the chassis.

The supplied software guides you through the process of setting up the printer and hooking it up to your wireless network. Those who suffer from a poor wireless signal will be disappointed to hear it lacks an Ethernet port, and although the Wifi antenna can be rotated it can't be replaced with a hi-gain antenna.

A multiformat card reader and Pictbridge USB port allow for quick printing from digital cameras, but the lack of an LCD preview display means you're best off previewing and editing them on your PC first. There is a small OLED display, but it's not colour and is really only of use during setup and maintenance tasks.

Photo quality is generally good, with strong, vivid colours, but closer inspection reveals a fair amount of speckling. It's not the fastest printer either, taking just under five minutes to produce an A4 'best quality' photo, and one minute 45 seconds for a 6x4 print.

However, the biggest problem we have with this printer is that it's staggeringly similar to the £69 Lexmark X4550 released early last year. Aside from aesthetic alterations and some new software features, including scheduled printing, there are few other changes. And, most importantly, performance both in terms of speed and quality is pretty much identical.

Lexmark tells us the X4550 is being discontinued, although we found it still on sale in various stores and how it can justify a £60 price hike for the X4650 is beyond us. *Will Stapley*

Verdict

Pros Easy to use; built-in Wifi; simple to set up

Cons Very similar to the X4550, but much more expensive; no Ethernet

Overall With the X4550 still available for much less, there's little reason to opt for this model

Features	★★★★☆
Performance	★★★★☆
Value for money	★☆☆☆☆
Overall	★★☆☆☆

Price £129.99

Contact Lexmark 0870 733 7100 www.lexmark.co.uk

Specifications Print, scan and copy functions • 4,800x1200dpi printing • 600x1,200ppi scanning • 25ppm mono • 18ppm colour • Four-colour printing (optional six-colour) • 802.11g wireless • USB2 • Pictbridge • Multiformat card reader • 5.3kg • 459x331x175mm (wxdxh) • One-year on-site warranty

MULTIFUNCTION DEVICE

Brother MFC-7840W

A compact printer/scanner suitable for home offices

For an office workhorse device, the Brother MFC-7840W is surprisingly small. Despite packing in a scanner, copier and fax facility (as well as the monochrome laser printer), it takes up little more space than a standard laser printer.

Installation was painless, largely thanks to the excellent manual that takes you through the whole process in fairly plain English. The printer can be connected directly to a computer using a USB cable, or to a network using the wired or wireless network connections. Being gluttons for punishment we jumped straight in to the wireless option, but making a connection was surprisingly simple. Even entering the network key is explained in the manual, and it connected to our network first time. The MFL-Pro Suite software likewise worked well, picking up the printer on the network straight away.

Taking just 25 seconds to print the first of our test pages from a cold start, it achieved a very impressive 12.5ppm in total. Photo printing was similarly quick at about 30 seconds for a full-page print, but while text quality was impressive (sharp even at small sizes), photos were not great. There was no visible banding, but entirely visible dots even on the highest quality settings hampered photo quality. Copying and scanning were similarly quick, with good-quality copies and the ability to scan straight to an email once the driver is installed. The printer doesn't have a duplex unit, so double-sided printing must be done manually using the supplied software.

Street pricing for standard toner (1,500 pages) costs about £30 (2p per page), while the high-yield version costs just £40 and is good for 2,600 pages (1.5p per page). Minor gripes aside, this is an excellent choice for home office use. *Anthony Dhanendran*

Verdict

Pros Small unit; good performance; low running costs; easy to connect

Cons: No duplex unit; photo quality not great

Overall Although it's not as cheap as some competitors, it's small and fast enough to make up for that

Features	★★★★★
Performance	★★★★☆
Value for money	★★★☆☆
Overall	★★★★☆

Price: £279.99

Contact: Brother 0845 6060626 www.brother.co.uk

Specifications 2400x600dpi printing/scanning • PCL6 emulation • USB 2 • Ethernet/802.11bg networking • 250-sheet paper feed • 32MB memory • 33.6Kbits/sec fax • 500-page memory • 1,500 page toner cartridge • One-year on-site warranty

Belinea

Your way to display

Belinea recommends Windows Vista® Home Premium

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Perfect to show off in your living room,
Discreet enough for your home office

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PC Essentials

Our pick of the latest components and accessories

Akasa Power Xtreme 1200W
Price: £224
www.akasa.co.uk
Overall: ★★★★☆

Akasa's latest high-end power supply is rated at 1,200W and features six independent +12v rails, a rated 80 per cent efficiency and a large price tag. It's just the job if you have, or are planning to add, a multi-graphic card setup as it comes with three 8/6-pin and six standard-pin PCI Express connectors.

Buffalo Firestix PC2-8500
Price: £45
www.buffalotech.com
Overall: ★★★★☆

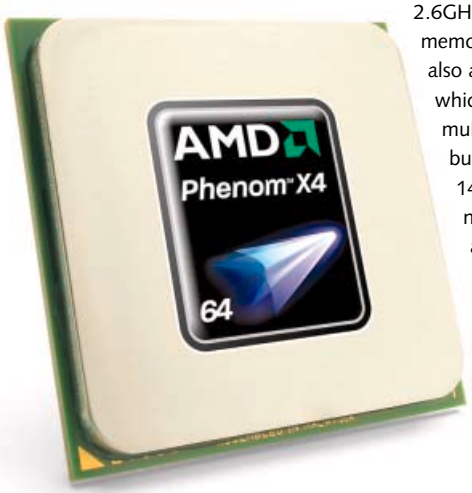
This 2GB kit comprises two 1GB modules of PC2-8500 DDR2 memory clocked at a standard 1,066MHz and with CAS5 (5-5-5-15) latencies. The modules also feature red heat sinks to go with the Firestix branding.

Coolermaster Z600
Price: £35
www.coolermaster.com
Overall: ★★★☆☆

A passive CPU cooler, the Z600 is designed in an X-shape with six U-shaped heatpipes that run from the copper base and up through the aluminium cooling fins. It's not suitable for the smaller case, however, as it measures 127x127x160mm (wxdxh) and weighs just over 1kg.

AMD Phenom X4 9950
Price: £160
www.amd.cm
Overall: ★★★★☆

AMD's latest high-end addition to the Phenom X4, quad-core range of CPUs is the 9950, which has clock of 2.6GHz and a fast 2GHz memory controller. It is also a Black Edition, which means the multiplier is unlocked, but with a TDP of 140W the cooling will need a lot of attention.



Dimastech Bench Table Easy V2
Price: £138
www.dimastech.it
Overall: ★★★★☆

If you're into overclocking, the last thing you need is a case to put everything in – instead you'll need to invest in a test rig. This well-designed rig is compatible with ATX, micro ATX and full ATX motherboards and can take three 3.5in and three 5.25in drives.

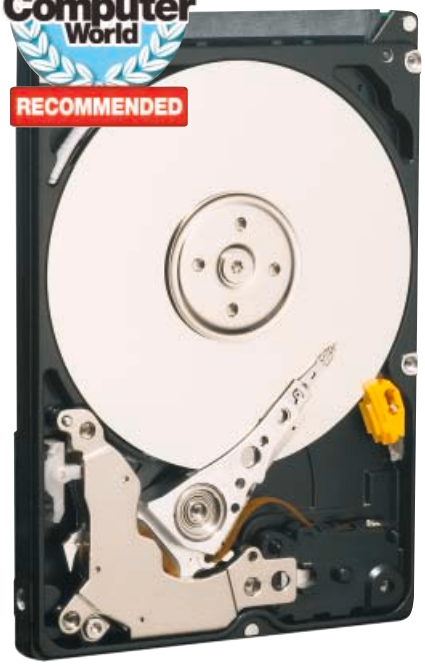
PNY XLR8
Price: £84.99
www.pny.com
Overall: ★★★★☆

This 2GB kit is the current top-of-the-range memory in PNY's line up. It consists of two 1GB PC2-9384 (DDR2 1,173MHz) models. Both are CAS5 rated (5-5-5-15) and designed run at 2.2v. They also feature large heatsinks complete with cooling fins.

Western Digital Scorpio Black 320
Price: £69.30
www.wdc.com
Overall: ★★★★★

The latest additions to Western Digital's Scorpio 2.5in drive line-up lurk under the banner of Scorpio Black and are all high performance drives ranging in capacity from 80GB up to this flagship 320GB model. What sets them apart from the other Scorpio's is a 7,200rpm spin speed and a 16MB cache.

Personal Computer World
RECOMMENDED



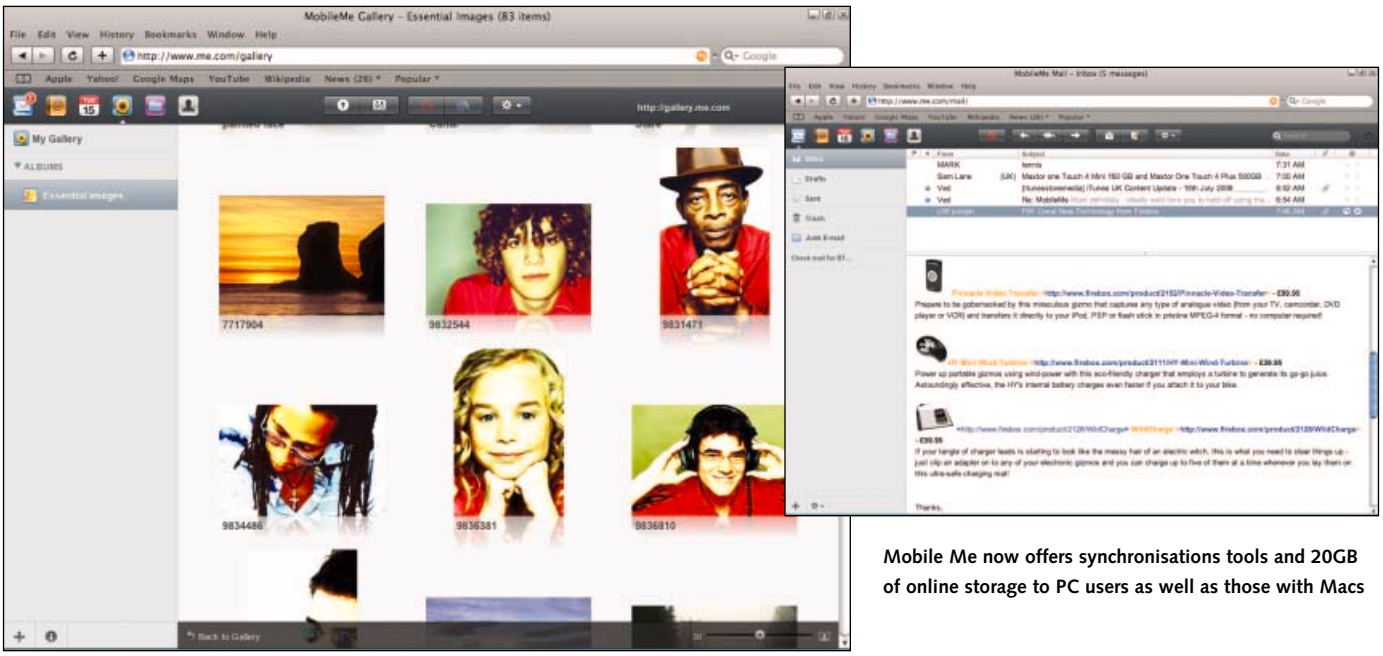
Zerotherm ZEN FZ-120
Price: £28
www.quietpc.com
Overall: ★★★☆☆

Zerotherm's Zen FZ-120 is a four heat-pipe CPU cooler that uses a standard 120mm PWM (pulse width modulated) fan which means it's easy to replace if necessary. Out of the box it's compatible with Intel's LGA775 socket, but to use it with AMD's sockets you will need to buy a separate ZC-AM2 bracket.

SYNCHRONISATION SOFTWARE

Apple Mobile Me

Apple extends its online service to PC users too – but with mixed results



Mobile Me now offers synchronisations tools and 20GB of online storage to PC users as well as those with Macs

Mobile Me started life as .Mac (pronounced 'dot-Mac') – an online email and storage service for Mac users. It also offered synchronisation features that made it possible to keep multiple Macs up to date with all your latest emails, contacts and calendar info. However, Mobile Me extends and updates that service so it now works with PCs, along with mobile devices such as the iPhone.

When you sign up for Mobile Me you get a new me.com email address, an iDisk that provides 20GB of online storage and a simple 'web gallery' tool that allows you to quickly create web pages containing an online photo-gallery. None of these features is worth paying a subscription of £59 per year, as companies such as Google, Yahoo and many others already provide similar services for free. However, the core of Mobile Me is the push system that allows it to synchronise information across multiple computers and devices.

Apple refers to Mobile Me as 'Exchange for the rest of us' – referring to the Microsoft Exchange server software that many large businesses use to manage their email and communications systems. It stores information such as your emails, contacts and calendars on an online server that Apple calls 'the cloud'. Any new emails, contacts or calendar events that you receive or create are automatically picked up by the cloud and transmitted to any device logged in to your Mobile Me account. This ensures all your devices are automatically updated with the same information.

The sync service does work well, and it's nice to just pick up your laptop knowing it will automatically sync with your main desktop computer and keep emails and contacts up to date. However, the documentation – a ramshackle collection of FAQs on the **www.me.com** website – is an unhelpful mess. It also leans towards Mac users who use their Mobile Me address as their primary email address. We struggled for some time to get the synchronisation features working with our office email address on our desktop and notebook PCs.

One solution is to use the suite of web apps that is also provided on the **www.me.com** website. Apple has created fully-featured email, contacts and calendar programs that work within your browser. This means you can keep up to date with your emails and other information by using any computer with an internet connection – handy if you're away from home without your laptop. However, that annoying Mac bias strikes again, as Apple warns that Internet Explorer may not work properly with these web apps and recommends using either Firefox or its own Safari browser.

That Mac bias means Mobile Me works best with Macs and the standard mail, contacts and calendar programs that Apple includes on all Mac models. Mobile Me does work with PCs, but coaxing it into life seems more of a struggle. And, of course, if Mobile Me is 'Exchange for the rest of us' then business users that already use Exchange won't need it at all. Ultimately, we can't recommend Mobile Me to PC users unless they have lots of computers, iPhones and iPods that would benefit from its synchronisation capabilities (again, the Mac bias means Mobile Me works with the iPhone but not with rival types of smartphone).

However, it's worth considering if you only use Macs, or if you're one of the increasing number of people who have a PC at work and a Mac at home. There's also a two-month free trial available, so you can try it out and see if it suits your needs before buying a full annual subscription. *Cliff Joseph*

Verdict

Pros Synchronises emails and other information across multiple computers
Cons Mac bias means that PC users may struggle to get the service set up properly
Overall A potentially useful service is marred by poor documentation and bias towards Macs and Apple software

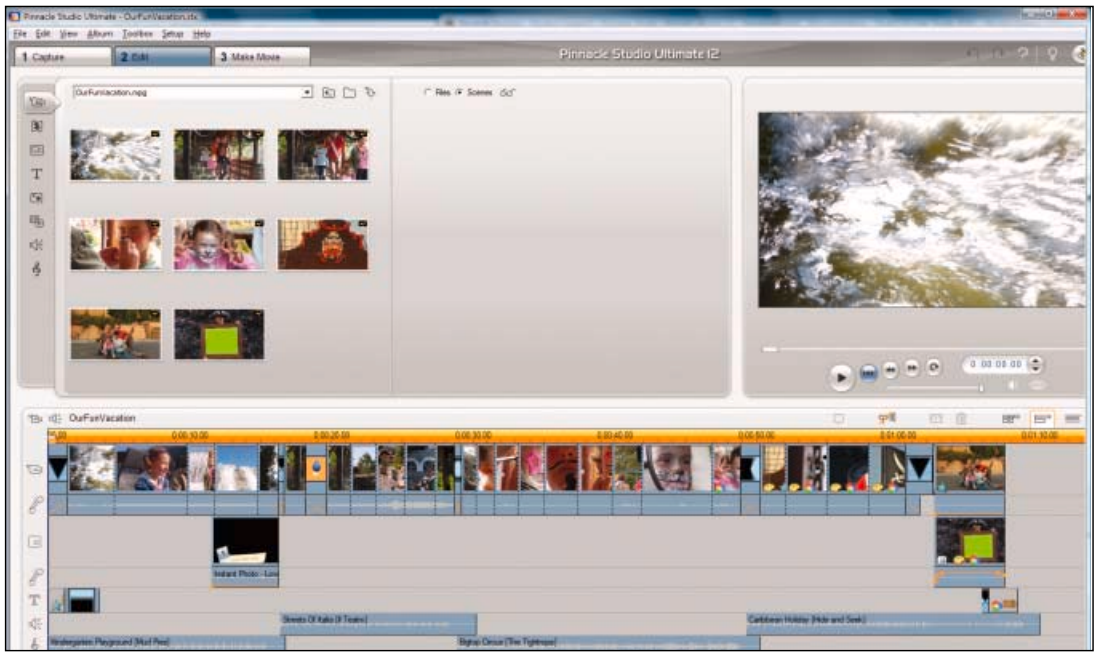
Features	★★★☆☆
Ease of use	★★★☆☆
Value for money	★★★☆☆
Overall	★★★☆☆

Price £59 per year
Contact Apple 0800 048 0408 www.mobileme.com
System requirements Internet Explorer 7 • Safari 3 or Firefox 3 • Outlook Express or Outlook 2003 or later • Windows Vista or XP/SP2 • Mac OS X v10.4.11

VIDEO EDITING

Pinnacle Studio 12 Ultimate

Has this home movie editing app reached the peak of its powers?



Studio 12 now uses the more detailed Timeline view as the default option for editors, though it is possible to switch to Storyboard

Version 12 of Pinnacle Studio is hardly what we would call a drastic reinvention. There appear to have been few immediately noticeable alterations since Studio 11. This isn't necessarily a bad thing – after all, what would be the point of junking a perfectly good workflow simply for the sake of it?

What worked last time (and the time before that), still works here, such as the familiar trio of tabs (Capture, Edit and Make Movie) at the top of the screen, which help to keep the task of editing a home movie as close to a three-step process as is humanly possible.

Elsewhere, things look pretty similar to when we last visited Studio; there are a couple of new buttons and tabs to explore, but the layout is essentially the same. The Album window is still context sensitive and displays a selection of clips, effects, photos or music depending on which of the tabs running down the side is selected. For the Ultimate Edition of Studio, Pinnacle has given up pretending that Storyboard editing mode is easier than working with the Timeline. In Studio 12, the more detailed Timeline view is the default option for editors, though it is possible to switch to working with the Storyboard instead.

One of the new buttons launches Pinnacle's most visible (though not necessarily the most important) addition to Studio: the Montage option. This is basically a glorified transition effect, wherein it is possible to drop clips and photos to create jazzy animations ('photo album comes to life', and the like) and spice up an otherwise run-of-the-mill holiday or wedding video. The selection of Montage themes available is fairly generous and they're all quite easy to apply, but the novelty will undoubtedly wear off quite quickly and using them to any great length is likely to produce a lot of identikit home videos.

Less immediately discernable additions to Studio 12 include improved support for importing and exporting different video formats. Native importing of full (1,080x1,920) high-definition AVCHD-format source video is now standard, though a powerful multi-core system is required for actually doing so.

At the other end of the deal, editors can now export straight to iPod, PSP, 3GP or DivX formats and even upload their finished clips directly to Youtube. Full support for burning discs in the Blu-ray BD-MV format is also included, obviously a Blu-ray burner is required for this. Mini Blu-ray discs can be burned to DVD in AVCHD format, and a similar feat can be achieved for HD DVD for anyone who has the required player.

In the press release accompanying the product, Pinnacle proudly boasts that some of Studio 12's new features were instigated at the request of users. These features turn out to be some advanced audio-editing capabilities, including master volume controls and a timeline VU (volume unit) meter with peak indicators, which seem like an unlikely selection of things for the public at large to have asked for. If they'd asked us, we would almost certainly have requested a stable version of the Studio code that didn't crash unexpectedly on us mid-edit and force us to reboot Windows every so often. Unfortunately, despite Pinnacle's claims of smooth integration with Vista, we experienced the precise same application fault (Event ID 1000, for anyone who's interested) as we did with Version 11. Further proof, perhaps, that little has changed either on or under the surface. *Jonathan Parkyn*

Verdict

Pros Native full-HD import and editing; Blue-ray export; lots of extra plug-ins

Cons Not many significant improvements; some stability issues

Overall Still the king of consumer video editing software, but there's not much incentive to upgrade if you already have a recent version

Features	★★★★☆
Ease of use	★★★★☆
Value for money	★★★★☆
Overall	★★★★☆

Price £90

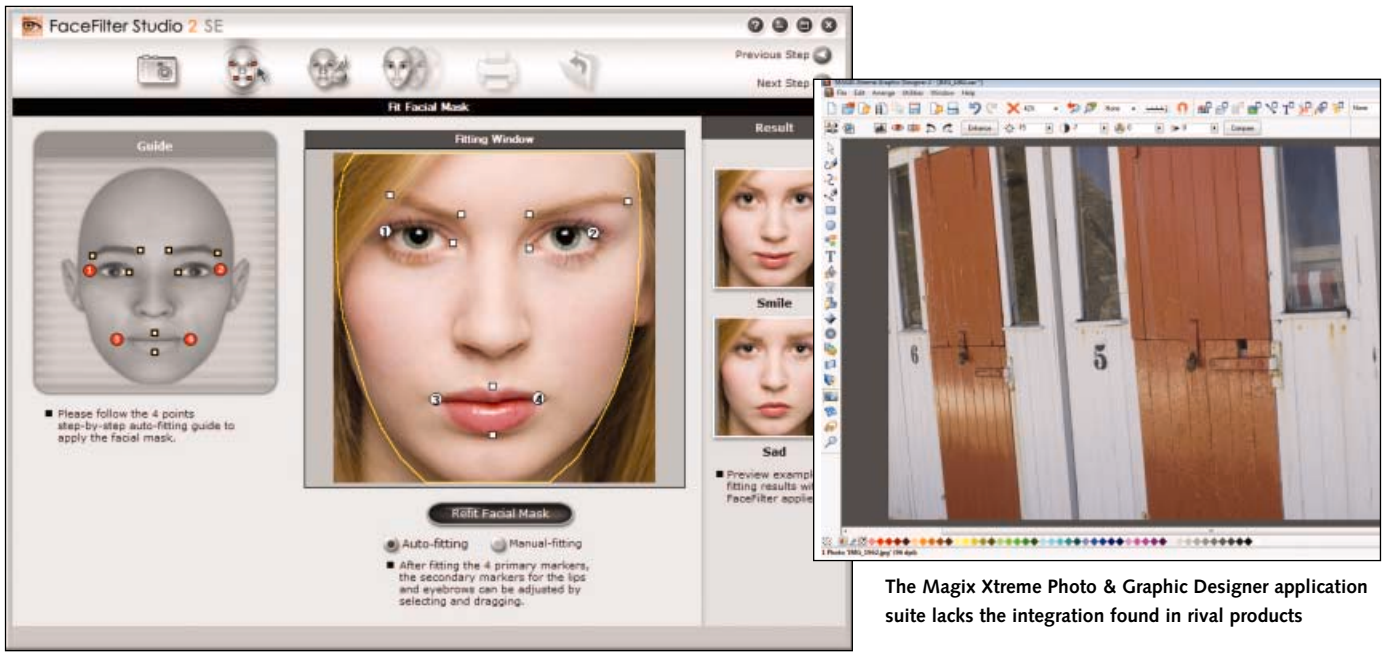
Contact Pinnacle 01753 655999 www.pinnaclesys.com

System requirements 1.8GHz processor (2.4GHz for Vista) • 1GB Ram (2GB for HD) • 3GB hard disk space • DVD-Rom • Windows XP/Vista

GRAPHICS SUITE

Magix Xtreme Photo & Graphic Designer

Some useful tools, but this suite could do with tighter integration



The Magix Xtreme Photo & Graphic Designer application suite lacks the integration found in rival products

A suite of three applications, Magix Xtreme Photo & Graphic Designer comprises a photo editor, vector graphics application and a photo manager. The problem with budget software suites that claim to do it all is that they rarely do one thing particularly well. So, is this the exception?

One of the things a software suite should do is integrate the individual programs so that you can move content easily between them, but Xtreme Photo & Graphic Designer doesn't feel like an integrated suite. When the suite launches, a start centre provides a selection of options divided into four categories – Photo, Design, Web design and (online) Services. Logically, you'd expect the photo tasks to launch the photo editor, but fast photo optimisation launches the vector application, which has a photo tool offering basic adjustments and corrections like red-eye removal, levels, saturation and auto enhance.

Other options on the Photo tab, such as detailed photo editing and the album, calendar and photo distortion and retouching tasks, open Extreme Photo Designer 7. This appears to be the same application we reviewed in our photo-editing group test (*PCW* June 2008). All of the new features in this release apply to the Graphic Designer 2 vector program.

It's a shame Magix hasn't paid more attention to Extreme Photo Designer 7, because it's the weakest element of the suite. The interface is inconsistent and the editing tools are neither sufficiently well-designed to be useful to novices, nor sophisticated and powerful enough to appeal to more advanced users. Often the single-click enhance filters make little difference to problems such as bad exposure or colour casts, and in some cases they make things worse. Guidance, in the form of a Task Assistant panel that replaces the toolbar on the left of the screen, lacks sufficient explanation of what the adjustment tools do, all the more confusing when they're not that effective in the first place.

Bizarrely, the image-editing features of the vector application have been upgraded, so in some areas it's superior to the photo editor. You can, for example, open camera Raw files in Graphic Designer 2, but not Photo Designer 7 (Magix also needs to do something about synchronising version numbers). So if you shoot Raw, you have to convert your photos using the vector application before editing them in the photo application.

The vector application itself is surprisingly good, with an excellent selection of tools for freehand and Bezier drawing, primitive shapes, 3D and live effects, and support for transparency and blending. It can be used as a web design tool and includes a well-stocked template library, as well as elements such as nav bars and buttons. The HTML export command will slice a page up and save the images and an HTML page for you.

You can also export Flash (.swf) files and, while there's no support for a lot of Flash authoring features like shape tweening, it does provide an inexpensive route to producing animated banners in Flash format.

The other notable addition is a standalone facial editing application called Facefilter Studio 2 SE, which uses distortion filters to manipulate facial features and, in the right circumstances, can be quite effective.

We've no problem recommending this on the strengths of Extreme Graphic Designer 2, but as a software suite, it needs work. Magix could start by improving Extreme Photo Designer 7, and making it much easier to produce content using the two applications together. *Ken McMahon*

Verdict

Pros Great vector application
Cons Poor photo editor; lacks integration
Overall Worth it for the vector editor alone, but look elsewhere for an application to both manage and edit your images

Features	★★☆☆☆
Ease of use	★★★☆☆
Value for money	★★★☆☆
Overall	★★★☆☆

Price £59.99
Contact Magix www.magix.com/uk
System requirements 700MHz processor • 256MB Ram • 500MB hard disk space • Windows XP/2000/Vista

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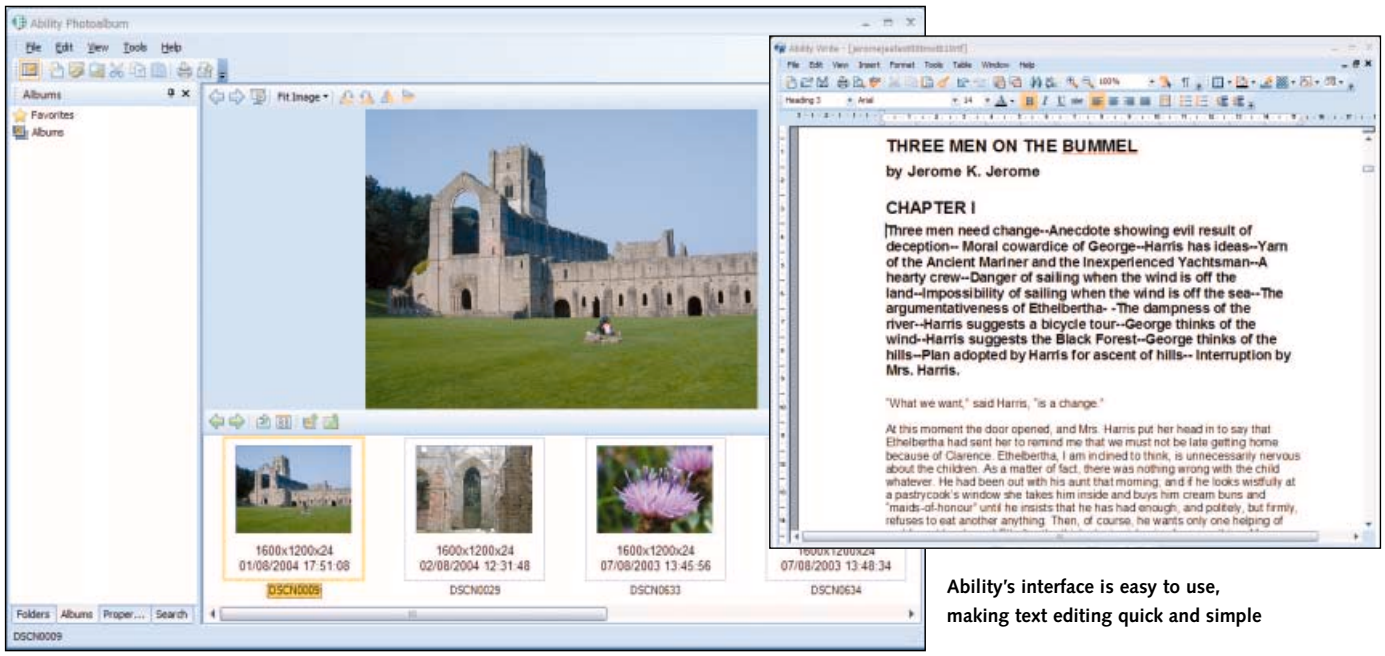
OFFICE SUITE

Ability Office Business

Is this value office suite good enough value to ward off Open Office?



Ability's interface is easy to use, making text editing quick and simple

Competition is fierce in the office suite market. Few suites can match Microsoft Office for collaboration and sheer presence, and Open Office can't be beaten on price. So where does that leave Ability Office Business (in effect, version 5 in the series), at a cost of £35?

To start with, it has photo-editing and management elements – something that's missing from both of the aforementioned suites – as well as a central launcher. The launcher sits as an icon in the system tray and acts as a shortcut to the seven programs in the suite.

Ability Write's look will be comforting to anyone feeling disconcerted by the changes in Office 2007. The icons are attractively designed, the menus are laid out in a familiar fashion and there is even a taskbar.

Ability Write is frustratingly loyal to its own file format. There's nothing wrong with promoting a file format, but even Open Office gives the option to default to Microsoft Word. Ability tells us that this prevents incompatible formatting information being lost, which seems fair enough, but it's still annoying.

There's no shortage of advanced document features with text effects to play and indexes. It's simple to create the latter and entries can be hidden to prevent the document from looking cluttered.

File import is particularly good, with support for some older formats, such as Ami Pro and Word Pro. Files can be exported in just as many formats and there is PDF export, too. However, there's no support for Office 2007 documents (.odf), which is hard to understand given that it is an open format.

The Spreadsheet model includes a well-designed formula helper, with tabs separating the various functions. There are about 200 formulas included, some of which can use arrays for more complicated calculations. Worksheet tabs can be coloured, but the colour is then applied to all the cells in the worksheet. It also failed to open a spreadsheet with some custom functions, but this may be due to the fact that the macros are based on VBScript rather than Visual Basic for Applications. Another limitation to macros is that it cannot record them to be used in Microsoft Office and Open Office, which may be a problem for anyone with existing spreadsheets or who has to share with others.

Ability Presentation continues the trend of the word processor and spreadsheet applications in that it's easy to use with an interface that will be familiar to anyone moving from Office 2003. However, it suffers when importing documents from Powerpoint. It is put to shame again by Open Office, which managed not only to include the title images created by Powerpoint 2007, but also kept the transparency colour.

The Database module is supplied with some good templates for tables and databases, covering a variety of tasks – from cataloguing a home music and film collection to planning a business project.

Finally, Ability has added image-editing applications in the form of Photopaint and Photoalbum. The latter includes the option to organise photos into albums, but it does not support tagging, which would make organising large collections easier. Photopaint, meanwhile, is a solid editor for basic image tweaks, but you'll need to buy a separate editor for advanced work.

Ability Office Business is very nearly a complete set of programs; the only missing pieces are email and PIM clients. However, the big problem for Ability is that Open Office does many tasks much better – and it's free.

Tim Smith

Verdict

Pros Well featured; photo-editing tools included; consistent interface; easy to use

Cons Lacks Office 2007 or ODF import; VBScript rather than VBA; no macro record

Overall A good office suite that does not lack any important features. Unfortunately, however, many tasks are performed better by Open Office

Features	★★★☆☆
Ease of use	★★★☆☆
Value for money	★★☆☆☆
Overall	★★★☆☆

Price £35

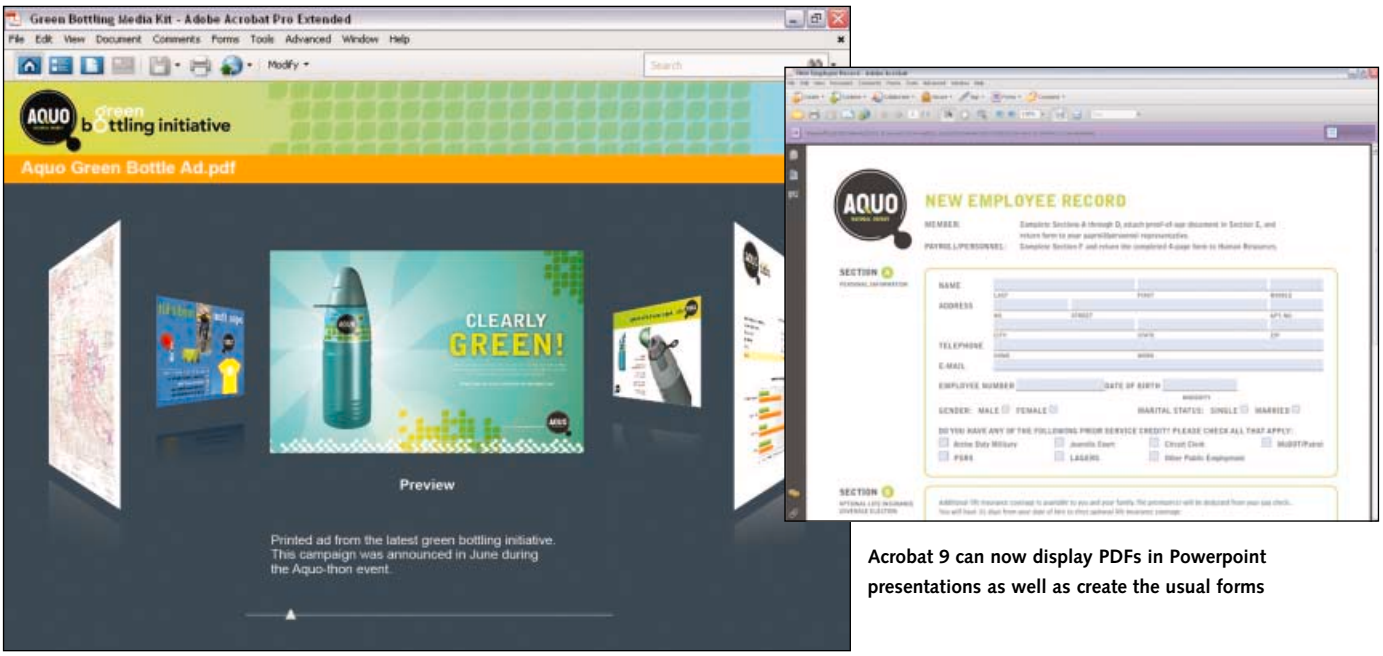
Contact ASI Ability
http://asiability.com

System requirements 300MHz processor • 128MB Ram • 100MB hard disk space • Windows XP/Vista

DOCUMENT CREATION

Adobe Acrobat 9 Pro

The popular Acrobat series branches out into multimedia



Acrobat 9 can now display PDFs in Powerpoint presentations as well as create the usual forms

Coinciding with the decision of the ISO (International Organisation for Standardisation) to adopt the Acrobat PDF file format as an official industry standard, comes the release of Acrobat 9 from Adobe.

And, with this upgrade, Adobe is continuing to transform PDF into an all-encompassing file format that allows you to combine all sorts of content, from simple text and graphics to web pages, video and even 3D graphics.

As always, the Acrobat name refers to a family of products rather than one specific piece of software. The basic Reader program – called Adobe Reader, rather than Acrobat Reader – remains a free download that allows anyone to read Acrobat PDF files. However, to create your own PDF files you need to buy one of the other products in the Acrobat range. As well as the Pro version reviewed here, it's available in Standard (£311.38) and Extended (£727.32) versions.

Businesses and other users that just want to create basic text and graphics documents, such as manuals and forms, will probably find the Standard version is all they need. The Standard version also allows you to add Flash Video files to PDF documents (Flash Video is the format used by sites such as Youtube), so you have some ability to create multimedia PDF files. However, to make best use of this option you'll really need the new Portfolio feature that is only available in the Pro and Extended versions.

Previous versions of Acrobat did have a limited ability to be used for presentations work, as they allowed you display a PDF document one page at a time. The Portfolio extends this into a full-scale presentations tool by allowing you to import and combine a variety of different file formats and assembling them within ready-made templates.

Clicking the Combine button in the program's main toolbar allows you to import any group of files you want to use in your portfolio – MS Office documents, existing PDF files, graphics and Flash Video files can all be used. Each file then acts like a slide within a presentation, and you can arrange these files using various layout templates.

The Portfolio feature can't compete with dedicated presentations programs such as Powerpoint, however, Acrobat 9 Pro Extended includes an additional feature called the Presenter that allows you to use Powerpoint presentations within PDF files. The advantage of this is that you can put the compressed PDF file onto a website or distribute it across an intranet so it can be read by anyone that has the free Adobe Reader. The Extended version also allows you to import other video formats, such Windows Media or Apple's Quicktime, and even 3D graphics taken from CAD programs.

The emphasis on multimedia content in this upgrade may mean Acrobat 9 isn't an immediate must-have upgrade for companies already using earlier versions of Acrobat to produce relatively simple forms and manuals. However, many users will appreciate the ability to create PDF Portfolios with Acrobat 9. We'd prefer simply Pro and Extended versions available at slightly lower prices, as £300 for the entry-level Standard version seems a bit steep. There's no doubt Acrobat is here to stay as a file format for distributing documents and information, and even many smaller businesses will probably benefit from having at least one copy of Acrobat 9 Standard available for sharing documents with clients and colleagues. *Cliff Joseph*

Verdict

Pros Improved video and multimedia content embedding within PDF files
Cons Expensive; Standard version lacks many of the key new features
Overall Designers that already use Acrobat will want to upgrade, but others may not find the new multimedia features essential

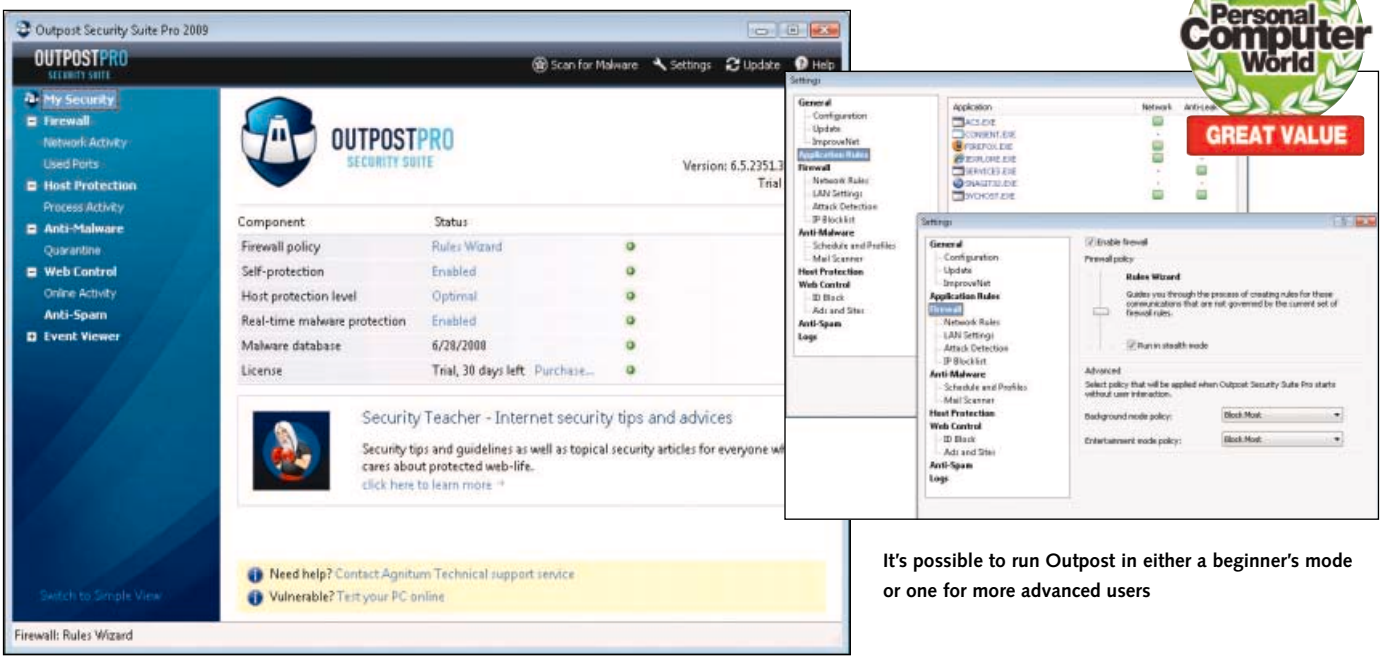
Features	★★★★☆
Ease of use	★★★☆☆
Value for money	★★★★☆
Overall	★★★★☆

Price £499.38
Contact Adobe 0800 0280 148 www.adobe.co.uk
System requirements 1.3GHz processor • 256MB Ram • 2GB hard disk space • DVD-Rom • Windows XP/Vista/Server 2003 • Mac OS X 10.4.11/5

SECURITY SUITE

Agnitum Outpost Security Suite 2009

Great value for money and plenty of improvements over the previous version



It's possible to run Outpost in either a beginner's mode or one for more advanced users

Agnitum's Outpost Security Suite 2009 is the new version of what is effectively a low-cost alternative to similar products from household names such as Norton and McAfee.

It offers a comprehensive degree of security against typical threats and includes a firewall, anti-virus, anti-spyware and anti-spam. You also get web control tools to protect against online threats.

Installation is straightforward and offers the option of advanced or standard control. Agnitum has been criticised in the past for making its interface overly confusing, leaving it awkward for beginners to gain a confident degree of control. It seems to have paid attention to much of the criticism though, since things are improved now.

A switch at the bottom left of the screen lets you alternate between 'simple' and 'expert' views; the former basically hides some of the more detailed options for tools such as the firewall and web control. Regardless of which you choose, you'll find options for adjusting settings are well controlled by an initial form that allows you to select from generic categories.

In the case of the firewall, for example, you can opt to Block Most, Allow Most, use the Rules Wizard or allow or block all. This way of setting things up is also used on the anti-malware and web control tools, making it easy to adjust the general security level.

For advanced users, there's a wide array of settings for tweaking just about every activity, process, port or protocol active on your machine, with each offering a range of tabs to fine-tune the behaviour of each. One problem we have with this approach is that there's no real middle ground between the two, it would have been good to see a more straightforward way of performing common tasks such as opening ports for specific applications or tweaking specific program access.

Anti-virus tools are buried within the Anti-malware section along with spyware, which is a sensible idea when you consider that most users would prefer to perform a single scan or update for any of a general range of threats.

Unlike many packages of this type you're also given access to an extensive array of information on exactly what threats were blocked or quarantined by the firewall or the various scans. Though this won't appeal to everyone, it makes it easy to diagnose problems you think might have been caused by applications that have been inadvertently blocked or discover the source of threats that attack your computer.

Anti-spam is easy to use and customisable so you can help the software identify exactly what sorts of emails you want blocked, and you're notified if websites you visit may contain potentially harmful materials and given the option to browse or not.

Most of these features are new or improved from previous versions, which shows just how far the suite has come over the past few years. In general it's a very unobtrusive security suite, with the Entertainment Mode making sure your gaming isn't interrupted by pop-up messages from the software.

When you take into account how cheap Outpost is compared to rival suites offering similar functionality, it's an excellent way to secure your PC. Purchase direct from **www.agnitum.com** and for £25 you get a one-year licence (this includes complete version updates) for one PC. A version for three PCs is £52, but unlike similar alternatives you get updates for two years instead of just one. All in all, it's tremendous value. *Paul Lester*

Verdict

Pros Comprehensive, customisable protection; detailed reports on all activities; unobtrusive; great value

Cons Some advanced settings tricky to manage; lacks extra features such as backup tools

Overall Outpost has improved its security suite considerably with the last couple of versions, with 2009 being the most streamlined and best value for money yet

Features	★★★☆☆
Ease of use	★★★★☆
Value for money	★★★★★
Overall	★★★★☆

Price $49.95 (£25 approx)

Contact Agnitum www.agnitum.com

System requirements 450MHz processor • 256MB Ram • 100MB hard drive space • Windows 2000/XP/Vista

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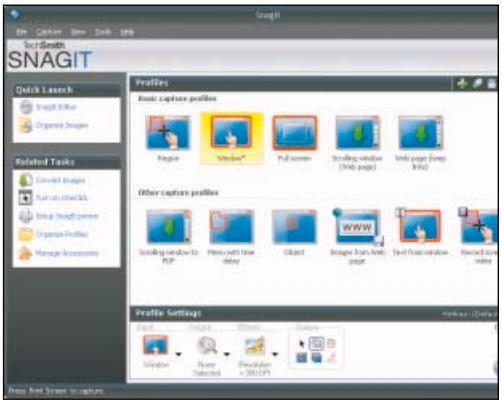
*Ability Office Business only †Compatible with MS Office *.doc, *.xls, *.ppt and *.ppt files, Adobe Photoshop *.psd files and all other major graphics formats.

SCREEN CAPTURE

Techsmith Snagit 9

Capture and organise screen grabs and videos



Research on the internet is now a full-on multimedia experience and simply being able to capture text is no longer enough. Snagit is a program that captures screens, web pages and videos, then brings them together into a finished document.

The utility sits as an icon in the system tray and also responds to the Print Screen button. More specific capture options can be selected by double-clicking on the icon to show the capture profiles. The region profile is capable of very accurate captures; a window appears showing a magnified view of the area around the cursor.

Advanced options include the ability to capture an entire web page; Snagit scrolls through the page and combines the images. This is a useful for anyone doing web design as the printing options on most browsers are not ideal. Links in web pages can also be captured.

Snagit can also capture what's happening on screen as a video file. The call out and text options as seen in the popular Camtasia alternative aren't present, but individual frames can be captured.

Once captures have been collected they can then be edited. The interface is similar to the ribbon-style interface of Microsoft Office 2007 and tags can be applied to grabs. You can add arrows and boxes to your captures, as well as highlight certain areas by filling them with a specific colour.

There are plenty of plug-ins available for Snagit, including a Firefox module to send captures direct to a blog (such as Wordpress and Moveabletype). However, it's something of a disappointment that the only office exporting option is to Microsoft Office; we had hoped for an Open Office export option.

If you frequently capture screenshots, Snagit works very well and comes highly recommended. *Tim Smith*

Personal Computer World RECOMMENDED

Verdict

Pros Works well; also captures videos; media can be tagged

Cons No callouts or text on video; no export to Open Office

Overall If you regularly take screenshots, this is a must-have utility

Features	★★★★☆
Ease of use	★★★★☆
Value for money	★★★★☆
Overall	★★★★☆

Price £30

Contact Techsmith
www.techsmith.com

System requirements 1GHz processor • 512MB Ram • 60MB hard disk space • Internet Explorer 6.0 • Windows 2000/XP/Vista

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Monthly Cap: 2GB	Monthly Cap: 15GB	Monthly Cap: 40GB	Monthly Cap: 100GB
Port Blocking: None Traffic Shaping: None	Port Blocking: None Traffic Shaping: None	Port Blocking: None Traffic Shaping: None	Port Blocking: None Traffic Shaping: None
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ROLE-PLAYING GAME

Mass Effect

A space-age, role-player with mass appeal

Mass Effect is an action role-playing game developed by the same team that created the highly acclaimed Star Wars: Knights of the Old Republic. You play as Commander Shepard, a bright young space marine upon whose shoulders rests a rather heavy weight: the prospect of galactic peace.

The game plays a neat balancing act throughout, remaining challenging and intriguing while ensuring that nothing is ever difficult enough to arrest the flow of the genuinely interesting plot.

As well as the main story campaign, there are dozens of unconnected planets to visit, side quests to tackle and relationships to explore.

Mass Effect can be as simple or as intricate as you want. You can custom-build your own hero or just settle with the default character if you'd prefer to get stuck in quickly. Likewise, you can closely monitor and develop individual attributes as your character gains experience points or simply choose to level up automatically.

Perhaps the best example of balance is the gameplay itself: Mass Effect is almost equal parts RPG and action shooter, which makes for an extremely playable combination.

Although not connected in any way to the Star Wars universe, Mass Effect clearly owes a lot to it. The ships, technology and weapons all bear a distinct similarity to their equivalents in George Lucas's pace opera (although there's no lightsaber, sadly), while the telekinetic force-style powers displayed by certain character classes and the backdrop of interstellar political intrigue feel like they've been lifted almost directly from the Skywalker saga.

None of that particularly matters, though, given the breadth of the Star Wars influence.

But we would say that if you've already played Knights of the Old Republic, Mass Effect occasionally feels like the same game without the official Lucasfilm branding.

That shouldn't put you off, though, as Mass Effect is a high-quality RPG. *Jonathan Parkyn*

Verdict

Overall A decent role-playing game that's easy to get to grips with

Overall ★★★★☆

Price £35

Contact Bioware www.masseffect.bioware.com

System requirements 2.4GHz processor • 1GB Ram (2GB Vista) • 12GB hard disk space • Nvidia Geforce 6800GT or ATI X1300 or better (not X1550, X1600 Pro or HD2400) • Windows XP/Vista

Best Buys

Your one-stop guide to the best-value products reviewed by PCW

With countless products available, shopping around for a new PC, peripheral or software package isn't an easy task, but with our Best Buys guide, you can make a quick purchase with confidence. We've split our Best Buys into 40 of the most popular categories, covering everything from desktop and notebook PCs right through to digital cameras and software.

Every month we'll update our Best Buys to include our most recent reviews and check the current pricing, although that's not to say you won't find a bargain online (try our price comparison site at **www.pcw.co.uk/bestprices**). You'll also find the date of the magazine in which the product was first reviewed, along with an alternative suggested product for that category. If the Best Buy entry has a web code listed alongside it, this means you can read the full product review on our website. Simply head online and use the format **www.pcw.co.uk/[web code]** – for example, **www.pcw.co.uk/2208243**.

Each Best Buy product has gone through our rigorous testing and reviewing procedures, making this your one-stop guide to the best products on the market.

BUDGET PC

Zoostorm 3364-2354
Price: £499
Reviewed: July 2008
www.pcnextday.co.uk
Web code: N/A
This PC comes with a quad-core Intel Q6600 processor, 2GB of Ram, a 250GB hard disk and a 19in TFT. The only downside is the integrated graphics, but with expansion opportunities inside the case, this can be rectified.

ALTERNATIVE

Chillblast Fusion Sentinel
£699 www.chillblast.com Web code: 2211955
A well-built, quiet PC with a quad-core processor, good all-round performance and space inside for future upgrades. It also features a Geforce 8800GT graphics card.

HIGH-END PC

Cyberpower Liquid Gamer Infinity SLI
£1,499.30
Reviewed: September 2008
www.cyberpowersystem.co.uk
Web code: 2221136
This PC's CPU is overclocked to 4.15GHz and it gives excellent 3D performance thanks to two Geforce 8800GTS graphics cards. The price doesn't include a monitor.

ALTERNATIVE

Ultraviolet Genesis XOC
£4,464.93 www.ultravioletmachines.com Web code: N/A
The price may make your eyes water, but it doesn't get much faster than this, with an overclocked QX6850 and two 8800 graphics cards.

BUDGET NOTEBOOK

Fujitsu Siemens Amilo Pi 2540
£499
Reviewed: October 2008
www.fujitsu-siemens.co.uk
Web code: N/A
The Amilo Pi 2540 is a bargain. Powered by a 2GHz Intel Core 2 Duo processor and a Radeon HD 2400 graphics card, it delivers exceptional performance for a cheap notebook.

ALTERNATIVE

Hi-Grade D7000SRL
£499 www.hi-grade.com Web code: N/A
With a stylish chassis, decent performance, Bluetooth and HDMI, you get a lot for your money with this 15.4in notebook.

HIGH-END NOTEBOOK

Toshiba Satellite P300-172
£1,198.99
Reviewed: September 2008
www.computers.toshiba.co.uk
Web code: N/A
This notebook has a large storage capacity, great CPU performance and it's also a joy to use. The pleasant screen and sleek chassis, along with its quiet and cool operation, makes it a great all-rounder.

ALTERNATIVE

Acer Aspire 8920G
£1,289.99 www.acer.com Web code: N/A
Thanks to a recent price drop, this 18.4in notebook is now even better value for money. Highlights include a 2.5GHz processor and Blu-ray drive.

WINDOWS HOME SERVER

Windows Home Server
Fujitsu Siemens Scaleo 1900
Price: £469
Reviewed: July 2008
www.fujitsu-siemens.co.uk
Web code: N/A
It might not be the most attractive piece of kit, but this Windows Home Server from Fujitsu Siemens has good read-and-write performance and useful added extras.

ALTERNATIVE

Belinea O.center
£386.58 www.belinea.com Web code: N/A
With a striking design and solid performance, the O.center is a great little Windows Home Server with easy hard disk access and good diagnostic tools.

ULTRA-MOBILE PC

Acer Aspire One
£200
Reviewed: September 2008
www.acer.co.uk
Web code: 2220487
This portable notebook combines a decent keyboard, clever storage system and a great design. Its Intel Atom processor runs at 1.6GHz and is backed up by 512MB of Ram. Best of all, it's priced at just £200.

ALTERNATIVE

Asus Eee 901
£319 www.asus.com Web code: 2220488
The new Eee's strong point is its battery life. In our tests, it lasted six and a half hours away from the mains, which is a real improvement over the last model.

BUDGET GRAPHICS CARD

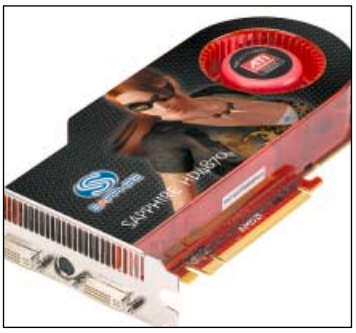
Palit Geforce 9600GT 512MB Sonic
Price: £121.32
Reviewed: June 2008
www.palit.biz
Web code: N/A
The G94 GPO used by this card is basically a cut-down version of the G92 8800 and GTS cards, but with fewer, yet faster-clocked, stream processors.

ALTERNATIVE

Asus EAH2400Pro
£32.89 http://uk.asus.com Web code: N/A
This card features low power consumption and, although not as fast as the Radeon HD 2400 Pro cards, it's cheap and has some impressive video capabilities.

HIGH-END GRAPHICS CARD

Sapphire Radeon HD4870
£181.76
Reviewed: October 2008
www.sapphiretech.com
Web code: N/A
A fast card at a great price. To give an idea of the rendering potential of this card, it managed 46 frames per second with 4x anti-aliasing and 4x antroscopic filtering turned on at 1,280x1,024 resolution.



ALTERNATIVE

Zotac Geforce GTX 280 AMP Edition
£366.27 www.zotac.com Web code: N/A
Zotac's version of the GTX280 is the fastest single core graphics card we've tested. The board also supports Nvidia's Hybrid Power technology.

TFT (17-22IN)

Philips 220WS8
Price: £189
Reviewed: February 2008
www.philips.co.uk
Web code: N/A
This 22in TFT screen has superb image quality, is evenly lit and, with a power draw of just 35W, is also extremely efficient. The icing on the cake is Philips' excellent pixel policy. A great buy.

ALTERNATIVE

Viewsonic VX2255
£259 www.viewsoniceurope.com Web code: N/A
The VX2255's clear and excellent pixel policy, along with its multimedia features, mean it is great value at £259, despite the distinctly average image quality.

TFT (24IN+)

Philips 240BW8
£309.95
Reviewed: September 2008
www.consumer.philips.com
Web code: N/A
This 24in screen has a professional feel and is well-suited to any application where you need to be sure that your on-screen colours are accurate. It also comes at a good price and features HDCP support.

ALTERNATIVE

Iiyama B2403WS
£299.60 www.iiyama.co.uk Web code: N/A
The 24in B2403WS from Iiyama offers a good balance of performance and features, and is suitable for a wide range of uses.

PROJECTOR

Panasonic PT-AX200E
Price: £1,099
Reviewed: March 2008
www.panasonic.co.uk
Web code: N/A
Bright enough for general PC use and amazing with movies and games, Panasonic's PT-AX200E HD projector is a wise choice and comes with dual-HDMI inputs along with excellent Game and Cinema presets.

ALTERNATIVE

Benq W500
£704 www.benq,co.uk Web code: N/A
At £700, the Benq W500 is something of a bargain and makes for an ideal entry-level home projector featuring 1080p/24 support.

SAT NAV

Tomtom Go 720
Price: £309
Reviewed: February 2008
www.tomtom.com
Web code: N/A
You're paying a bit more than you might for a number of perfectly capable rivals, but you get so much for your money with the Tomtom Go 720, including a customisable display and great performance on the road.

ALTERNATIVE

Mio 620t
£269 www.mio-tech.be Web code: N/A
Mio's new software is impressive and, considering the range of features, it's priced competitively. The maps look great and performance is equally good.

SMARTPHONE

02 XDA Stellar
Price: £From free
Reviewed: March 2008
www.o2.co.uk
Web code: 2207227
Available on a number of other networks (and Sim-free), this smartphone features a slide-out display, Qwerty keyboard, built-in GPS and Windows Mobile 6. The screen also tilts for easier typing.

ALTERNATIVE

Nokia E51
£ From free www.nokia.co.uk Web code: 2200554
Marketed as a business phone but with Wifi, HSDPA and multimedia tools, such as an FM radio, the Nokia E51 is great for both corporate and home users.

DIGITAL CAMERA

Samsung NV24HD
£249
Reviewed: October 2008
www.samsungcamera.com
Web code: N/A
With excellent build quality, a 10.2-megapixel CCD and wide angle 24mm lens, this digital camera is perfect for taking detailed outdoor shots. It also features 720p movie recording, so you can capture video in high definition.

ALTERNATIVE

Pentax Optio A40
£219 www.pentax.co.uk Web code: N/A
This 12-megapixel compact camera houses some great features, not least of which is the excellent image stabiliser. It also shoots great photos.

PORTABLE MEDIA PLAYER

Sony NWZ-A815
Price: £89
Reviewed: January 2008
www.sony.co.uk
Web code: 2203060
It might lack some of the extra features found in other media players, but this Sony model excels in terms of audio quality and is easy to navigate. It also comes with a decent set of headphones.

ALTERNATIVE

Apple iPod Nano
£129 www.apple.com/uk Web code: 2199118
An astonishing design that produces good-quality video and audio. It also benefits from excellent battery life.

MEDIA STREAMER

D-Link DSM-330
£135
Reviewed: October 2008
www.dlink.co.uk
Web code: N/A
With its excellent usability and simple setup procedure, this device makes sharing your media collection simple. It features an HDMI port, can output 720p video and performs extremely well. If ease of use is important to you, this is the media streamer to buy.

ALTERNATIVE

Archos TV+
£249 www.archos.co.uk Web code: 2210545
With a 250GB hard disk, this device not only streams media across a network, but can also store your entire video, music and photo collection locally.

LASER PRINTER

Brother HL-2170W
Price: £149
Reviewed: March 2008
www.brother.co.uk
Web code: 2207225
If you're looking for a good-quality monochrome laser printer for general home use, this Brother model is definitely worth considering. It's fast, compact and even has a wireless adapter. A bargain at this price.

ALTERNATIVE

Lexmark X500n
£301 www.lexmark.co.uk Web code: N/A
An amazingly good-value laser printer, considering it's not only colour but also includes a scanner allowing you to scan, copy and print at speed.

PHOTO PRINTER

Canon Selphy CP750
Price: £110
Reviewed: October 2007
www.canon.co.uk
Web code: 2193769
It's a little bulky when in use, but this dedicated photo printer can produce high-quality prints in less than 70 seconds. And a 2.4in display allows you to perform basic image editing before printing.

ALTERNATIVE

Sony DPP-FP90
£150 www.sony.co.uk Web code: 2196751
It's not particularly cheap to run, but this printer produces high-quality photos from a variety of sources and is reasonably fast as well.

MULTIFUNCTION PRINTER

HP Photosmart C7280
Price: £249
Reviewed: May 2008
www.hp.com/uk
Web code: N/A
Aimed mainly at home office users who need both a fax and great photo printing. Combine this with high-quality printing, scanning and copying and you've an impressive piece of kit on your hands.

ALTERNATIVE

Kodak Easyshare 5500
£199 www.kodak.co.uk Web code: 219926
This multifunction device features decent print, copy and scan functions, but it's big draw is its low running costs.

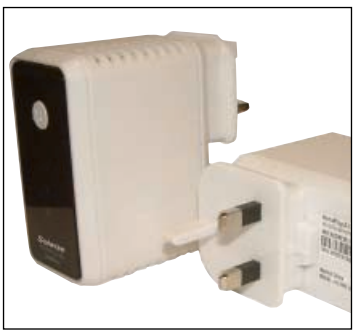
NETWORK-ATTACHED STORAGE

Qnap TS-209
Price: £254
Reviewed: Christmas 2007
www.qnap.com
Web code: 2200223
If you're after a Nas device that does more than just share files over your network, this is it. You can schedule Bit Torrent downloads, stream media to UPnP devices and install your own drives in it.

ALTERNATIVE

Acer Aspire Easystore
£499 www.acer.co.uk Web code: 2206105
This Nas device features 2TB of storage (other sizes are available), along with wireless so you can place it anywhere in your home.

POWERLINE NETWORKING



Solwise NET-PL-200AV Push
Price: £50
Reviewed: March 2008
www.solwise.co.uk
Web code: 2207035
You'll need at least two of these to get your powerline network running, but they're the best around. Based on the Homeplug AV standard, they're fast, resilient to electrical noise and great value for money.

ALTERNATIVE

Devolo Dlan 200 AV
£149 www.devolo.co.uk Web code: N/A
Small and well-designed, these Devolo powerline devices use the Homeplug AV standard and have pre-programmed Quality of Service rules built in.

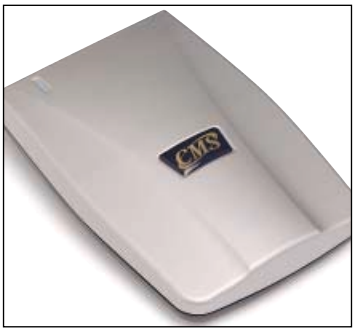
WIRELESS ROUTER

Linksys WAG325N
Price: £99.99
Reviewed: May 2008
www.linksys.com
Web code: N/A
It might look a little unconventional, but this Draft-N router from Linksys performs extremely well. It also features some sophisticated tools, including VPN support and the option of creating virtual wireless networks.

ALTERNATIVE

Solwise Engenius Wireless-N Gigabit Router
£120 www.solwise.co.uk Web code: n/a
It might be a little pricey, but this router performed well in our tests and comes complete with some advanced network filtering tools.

EXTERNAL HARD DISK



CMS V2ABS-CE-120
Price: £175
Reviewed: Christmas 2007
www.cmsproducts.com
Web code: 2202396
A portable USB2 external hard disk that weighs a mere 150g and comes with built-in 256-bit AES encryption. Inside the case sits a 2.5in 120GB 5,400rpm Sata notebook hard disk.

ALTERNATIVE

Western Digital Mybook Studio
£204 www.westerndigital.com Web code: 2206075
This stylish 1TB external disk comes with USB2, Firewire 800/400 and eSata interfaces for ultimate flexibility.

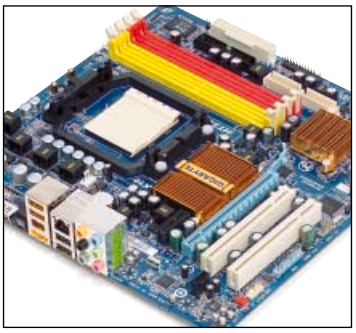
INTERNAL HARD DISK

Western Digital WD10EACS
Price: £185
Reviewed: January 2008
www.westerndigital.com
Web code: 2203061
This disk features four 250GB platters to provide 1TB of storage. It includes some advanced technology such as Intelliseek, which calculates optimum seek speeds to lower noise, vibration and power usage.

ALTERNATIVE

Toshiba MK2035GSS
£79 www.toshiba.co.uk Web code: 2203064
Weighing just 98g, this 200GB 2.5in Sata hard disk is perfect for increasing the storage capacity of your notebook.

AMD MOTHERBOARD



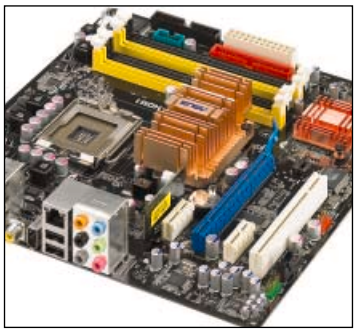
Gigabyte GA-MA78GM-S2H
Price: £60
Reviewed: June 2008
www.giga-byte.co.uk
Web code: N/A
With a wide range of ports, including eSata, and a good selection of options in the Bios, this is a great AMD board. Finally, after two years of losing to Intel, AMD's engineers have a winner on their hands.

ALTERNATIVE

EQS AB1S-RS690MKM
£46 www.eqscomputers.com Web code: 2204803
The cramped design limits upgrade potential, but it's a keenly priced AMD motherboard that features an on-board HDMI port for HD video.

INTEL MOTHERBOARD

Asus P5E-VM HDMI
Price: £81
Reviewed: June 2008
http://uk.asus.com
Web code: N/A
This board has a great range of features. With the integrated graphics enabled, we comfortably overclocked it to 3GHz with our 2.4GHz Core 2 Quad Q6600 attached, so enthusiasts should take note of its capabilities.



ALTERNATIVE

Gigabyte GA-G31MX-S2
£53 www.giga-byte.com Web code: 2202711
Considering the price, you get plenty of features on this Intel board, including Intel's G31 Express chipset and ICH7 Southbridge.

PC CASE

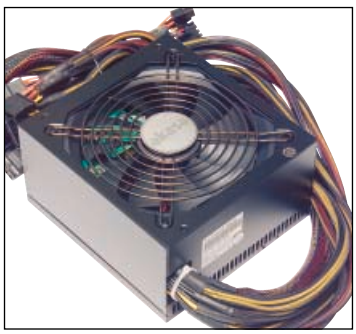
Akasa Eclipse-62 V2
Price: £92.38
Reviewed: May 2008
www.akasa.co.uk
Web code: N/A
It might not have the flashy design of some cases, but with the whole case, including the roof, able to come apart, along with its easily removable motherboard plate, it's an ideal chassis for enthusiasts and modders alike.

ALTERNATIVE

Coolermaster Cosmos 1010
£139.83 www.coolermaster.com Web code: n/a
Thanks to its extra-large design, this case not only looks impressive but is also very easy to work on and comes complete with temperature probes.

POWER SUPPLY

Akasa Powermax 1000
Price: £135.11
Reviewed: March 2008
www.akasa.co.uk
Web code: 2207736
This 1,000W power supply has two +12V rails and its single 135mm dual-ball bearing fan makes it a lot quieter than you would expect. It also comes with a variety of power connectors.



ALTERNATIVE

Enermax Galaxy 1000W
£233.83 www.enermax.com.tw Web code: 2164011
The 1,000W Enermax Galaxy power supply will suit those with SLI graphics and other power-sapping components, but it comes at a fairly high price.

OFFICE SUITE

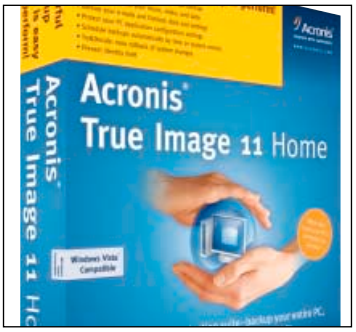
Microsoft Office 2007
Price: £357
Reviewed: May 2007
www.microsoft.com
Web code: 2183475
The new interface to Office is something you'll either like or loathe – we like it, but upgrading comes at a price, both in cash and in effort. Despite this, it's still the leader in office productivity software.

ALTERNATIVE

Corel Wordperfect X3
£276 www.corel.co.uk Web code: 2149856
This latest version of Corel's office suite includes tools such as PDF exporting, along with improved compatibility with other office applications.

SYSTEM UTILITY

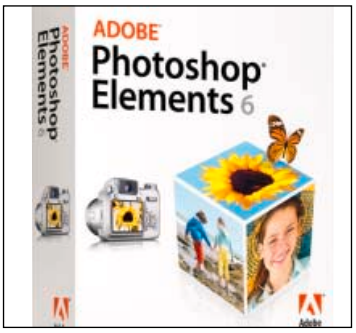
Acronis True Image 11
Price: £39.99
Reviewed: April 2008
www.acronis.co.uk
Web code: 2208669
True Image 11 is an excellent backup and recovery solution that offers an unprecedented level of control over disk cloning, scheduled backups and secure file deletion. And, despite the range of features, it's easy to use.



ALTERNATIVE

Paragon Hard Disk Manager
£29.99 www.paragon-software.com Web code: 2205339
A comprehensive, all-in-one suite of hard disk maintenance and backup tools that's easy to get to grips with and comes at a good price.

IMAGE EDITING



Adobe Photoshop Elements
Price: £69
Reviewed: June 2008
www.adobe.co.uk
Web code: N/A
Although the interface could do with some work, this is still the best image editor currently available for home users. With a range of advanced tools, it really does help you get the best from your photos.

ALTERNATIVE

Corel Paint Shop Pro X2
£79 www.corel.com Web code: n/a
A little more expensive than its main rival, Photoshop Elements, but Paint Shop Pro X2 excels in terms of ease of use.

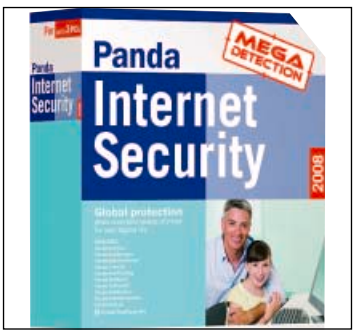
VIDEO EDITING

Pinnacle Studio 12 Ultimate
£90
Reviewed: October 2008
www.pinnaclesys.com
Web code: N/A
Pinnacle has stuck with its usual intuitive interface and added a host of extra features, including new special effects and the ability to import full HD video from AVCHD sources. It can also export direct to Blu-ray.

ALTERNATIVE

Cyberlink Powerdirector 7
£59.95 www.cyberlink.com Web code: N/A
With useful 'magic' tools that simplify the editing process, this complete package from Cyberlink is ideal for newcomers to video editing and is well priced.

PC SECURITY



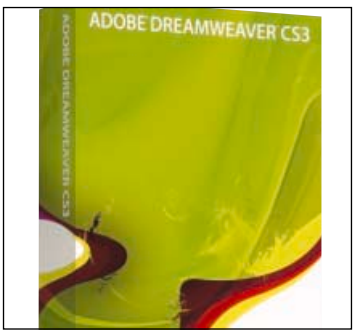
Panda Internet Security 2008
Price: £42.99
Reviewed: January 2008
www.pandasecurity.com
Web code: N/A
A feature-packed internet security suite with fast anti-virus and spyware detection tools, including heuristic scanning. It also has fast scan times and a decent firewall, along with backup and PC optimisation features.

ALTERNATIVE

Agnitum Outpost Pro Security Suite 2008
£30.80 www.agnitum.com Web code: 2204511
Outpost offers solid protection at a competitive price with fast scanning and a quality firewall, although it does lack some extras found in rival suites.

WEB DESIGN

Adobe Dreamweaver CS3
Price: £393
Reviewed: July 2007
www.adobe.com
Web code: 2186591
Powerful HTML coding and design tools along with CSS templates and Ajax widgets will help non-programmers get started. There's also a big emphasis on CSS, including a CSS Advisor tool for newcomers.



ALTERNATIVE

Microsoft Expression Web
£260 www.microsoft.com Web code: 2185242
Expression Web is a very good web-editing suite if you accept the inevitable Microsoft bias, and features CSS support and a powerful interface.

BUSINESS PC

Dell Latitude D531
Price: £586
Reviewed: October 2007
www.dell.com
Web code: N/A
With a dual-core AMD Turion processor clocked at 1.8GHz, 2GB of Ram and Vista Business, this is a good budget model. It also features a built-in DVD writer, 120GB Sata hard disk and both Wifi and Bluetooth.

ALTERNATIVE

HP Compaq dc7800
£598 www.hp.co.uk Web code: 2207533
The space-saving design of this affordable business desktop is very compelling and it can attach directly to an optional HP TFT screen.

BUSINESS PRINTER

HP Laserjet P1505n
Price: £205.63
Reviewed: June 2008
www.hp.com
Web code: N/A
Compact, stylish and quicker than it looks, this Laserjet from HP is a very capable small-business printer and is stunningly good value to boot. It also features an integrated network interface.

ALTERNATIVE

Zebra P100i
£1,245.50 www.zebracard.com Web code: 2212221
A great device for small businesses needing to print plastic cards in volume. It takes up little desk space and can print in full colour.

NETWORK SECURITY

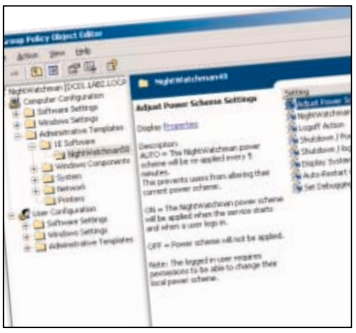
Smoothwall Smoothguard 1000-UTM
Price: £3,231.25
Reviewed: September 2007
www.smoothwall.net
Web code: 2194393
A comprehensive array of security tools, load balancing and failover facilities, and extensive reporting options, mean this network security device justifies the high price.

ALTERNATIVE

Webroot Antispyware Corporate
£22.56 www.webroot.com Web code: N/A
At this price you get a one-year licence for 10 users, which is great value. It also covers two key client security bases in one go.

NETWORK MANAGEMENT

1E Nightwatchman
Price: £14.10
Reviewed: March 2008
www.1e.com
Web code: 2207429
This piece of software costs very little, but could save you a lot. Using simple command line controls, it will close applications on PCs on your network, then shut the machines down to cut your energy bills.



ALTERNATIVE

Prefix IT PrefixNE
Up to £2.94 per PC per month www.prefixit.com Web code: 2205651
Easy to install and use, this network management application allows you to keep track of all the kit on your network and is perfect for small businesses.

COLLABORATION SOFTWARE

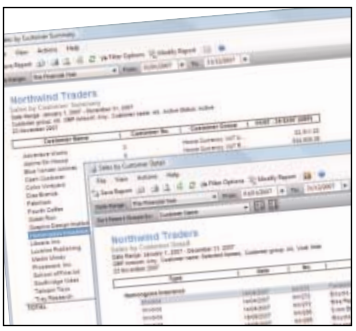
Nuance PDF Converter Professional 5
Price: £99
Reviewed: June 2008
www.nuance.co.uk
Web code: N/A
It may often take second billing to Adobe Acrobat, but this latest release is cheaper and just as good – if not better. The only problem is there are so many new tools to learn.

ALTERNATIVE

C2C Archive One Policy Manager
£40 www.c2c.com Web code: 2212370
This is a well-conceived and easy-to-implement exchange storage management tool that can enhance performance and even reduce costs.

BUSINESS ACCOUNTS SOFTWARE

Microsoft Accounting 2008
Price: £149
Reviewed: February 2008
www.samsung.co.uk
Web code: 2207529
A late entrant to the UK accounting market, Office Accounting 2008 is easy to use, feature rich and will shake up the competition. It also offers in-depth integration with Outlook 2007 Business Contact Manager.



ALTERNATIVE

Intuit Quickbooks Pro 2008
£299 www.quickbooks.co.uk Web code: 2203178
A sensible update to what is one of the most accessible and easy to master small-business accounting packages around. Includes syncing with Outlook.

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Personal Computer World

How we test

Performance testing is an important part of *PCW*'s reviewing process, and to obtain our authoritative results we use the UK's best PC testing resource. Here we explain why you can trust our results and give you a tour of our most frequently used benchmark programs

At the core of our PC performance tests are industry-standard benchmarks from Bapco and Futuremark. Sysmark 2007 Preview is the latest Vista-compatible version in a long line of Bapco benchmarks and it allows us, for the first time, to compare the application performance of Windows XP and Windows Vista-based systems with the same benchmark. It tests real-world application performance by running a series of scripts to mimic authentic user tasks. It loads and runs full versions of 14 market-leading applications, which are:

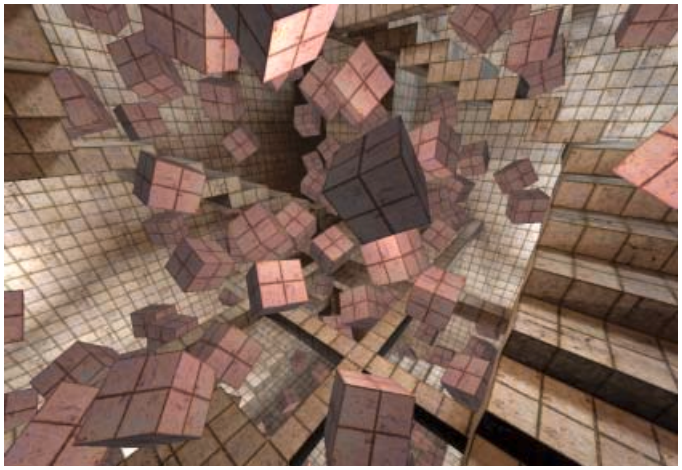
- Adobe After Effects 7
- Adobe Illustrator CS2
- Sketchup 5
- Adobe Photoshop CS2
- Autodesk 3ds Max 8
- Sony Vegas 7
- Macromedia Flash 8
- Microsoft Excel 2003
- Winzip 10
- Microsoft Outlook 2003
- Microsoft Powerpoint 2003
- Microsoft Word 2003
- Microsoft Project 2003
- Microsoft Windows Media Encoder 9 series

Note that scores from Sysmark 2007 Preview are not comparable to scores from previous versions of Sysmark. All scores are relative to the Sysmark reference machine, which scores 100 (see below for details).

In *PCW's* labs, our staff have over 20 years of combined testing experience. We know all the perils and pitfalls of practical benchmarking, and we contribute to the development of industry-standard benchmarks through our full membership of Bapco (**www.bapco.com**), the non-profit benchmark consortium. Listed below are the main benchmarks we use for testing PC systems and components.

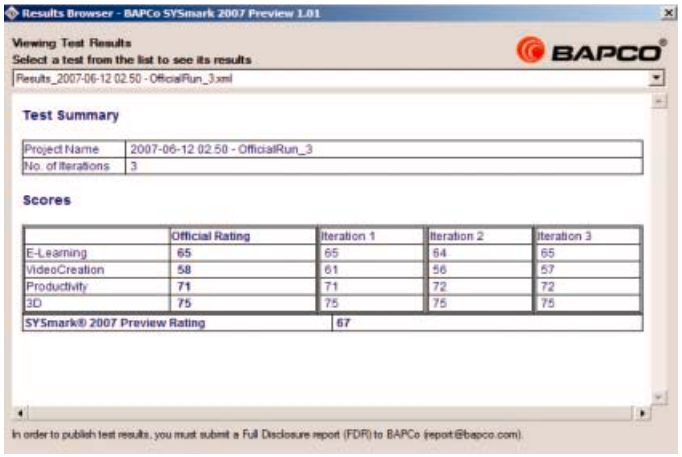
- Bapco Sysmark 2007 Preview – an application-based benchmark that tests real-world system performance.
- Futuremark 3Dmark06 – the latest version of 3Dmark that tests DirectX 3D graphics performance.
- Games – we use built-in benchmarks in Far Cry and Fear to see how graphics cards perform in a real-world games.
- Futuremark PCmark05 – a synthetic benchmark used to test the performance of a PC's major subsystems.
- Test beds – we use standardised AMD and Intel-based test rigs to test components and peripherals.

There's more information about our testing procedures and benchmarks on our Labs site at **www.reportlabs.com/testbed/bguides/benchmarks.php**.



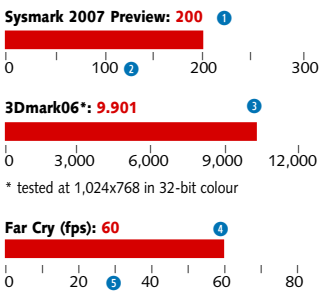
PCmark05 measures memory, processor, graphics and hard drive performance

3Dmark06 is used to test 3D graphics performance



Sysmark 2007 Preview tests real-world performance using common apps

Performance



1 A score of 200 indicates that the system is twice as fast as the reference PC.

2 The reference PC (Intel Core 2 Duo E6300 1.8GHz, 1GB Ram) scores 100.

3 An Nvidia Geforce 8600GT would score in the region of 9,900.

4 Fear: A score of 60fps (frames per second) or higher is most desirable.

5 A result of 30fps or above means the machine can produce playable frame rates at the tested resolution.

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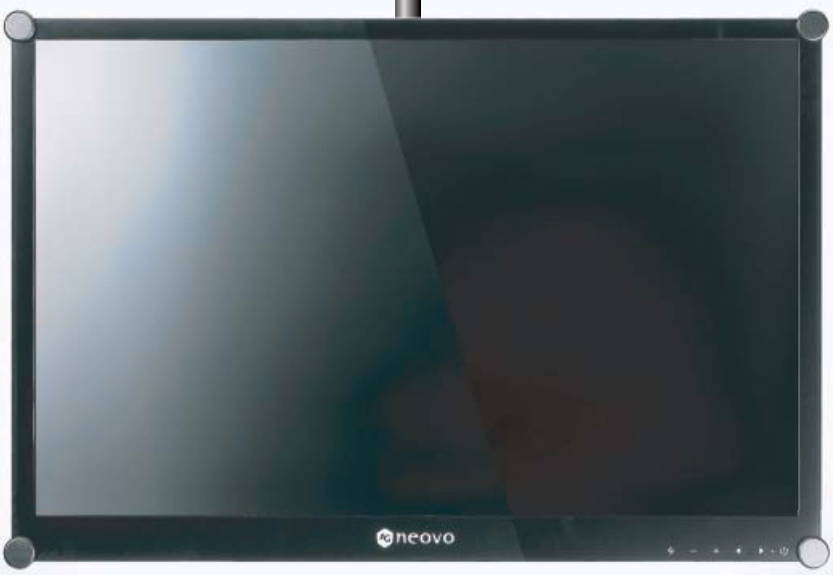

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ON TEST

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Editor's Choice

'We wanted to feature a wide range of laptop designs, suiting various purposes'

Notebooks that pack a punch

Low-cost laptops are certainly taking the market by storm. Emil Larsen puts eight models through their paces and picks the best of the bunch

The back-to-school period is upon us, and university students and school pupils across the country will be holding their parents to ransom, arguing that their own notebook will ensure good grades – and a £500 device often fits the bill perfectly.

The Asus Eee PC sent shockwaves through the low-cost laptop market, striking fear into the heart of many manufacturers. Sony responded by saying it didn't want to be involved in a rush to the bottom, where profits evaporate away.

Last issue, we recommended the Atom-based Acer Aspire One and Asus Eee PC laptops, which cost less than £500. They remain excellent second computers, but as they have no DVD drive and aren't good for typing long essays on, they're not good all-rounders.

For this group test, we wanted to feature a wide range of laptop designs, suiting various purposes (not just the back-to-school crowd). As such, we decided the only restriction was a price ceiling.

At this end of the market, it's not just performance that gets the squeeze – it's often also the chassis design, materials and warranties that feel the pinch, so we've inspected every part of these, as well as judging each laptop on its own merits.

The hardware on show today might not be top of the range, but for media playback, word processing and web surfing, it's nearly impossible to tell the difference between these laptops and those that are triple the price.

↘

Advent 5313

Price £399 **Contact** Advent 0844 561 0000 www.pcworld.co.uk

Undercutting our price barrier by £100 while offering a good processor, Ram and hard drive is an impressive feat from the Advent 5313.

A Core 2 Duo T5750 running at 2GHz (which has half the L2 cache – 2MB rather than 4MB – compared with a premium 2GHz T7200 processor), 2GB Ram and a 200GB hard disk are served as the meat and potatoes of the 5313.

The PCmark05 CPU and hard disk scores were good, but the overall score dropped to 3,167 due to the 5313's chipset and graphics, provided by Sis. They're a step behind Intel's equivalents, providing a particularly nasty gaming experience; the frame rate in Fear wasn't just low, the 3D picture quality was actually blurry alongside the competition.

That said, we can forgive poor 3D quality on a £400 machine, even though Vista features a 3D interface. When closed, it feels like a great laptop and the lid has a classy design with a slick finish. But when you open it up, a black spread of grooved plastic is revealed, which looks very cheap.

The keys have the same round-edged style you'd find on a high-spec Sony Vaio laptop, but the keyboard itself is astonishingly poor. As well as suffering from terrible flex and rattle to the entire keyboard, individual keys have different heights, with every row oddly tilted towards your body. The end result is that some keys don't always respond to being typed on and we're very sceptical about how long the keyboard will survive.

The speakers are rather tinny and, due to a meagre 2,200mAh battery, the 5313 will only survive for 75 minutes away from the mains when playing a DVD. However, if you're on a tight budget and are prepared to make use of an external keyboard it's worth a look, but the Fujitsu Siemens alternative is a better deal.

Verdict

Pros Great core performance; attractive exterior

Cons Awful keyboard; dubious aesthetic design; poor battery life; very poor 3D performance

Overall With a better keyboard, it would be a great buy, but its keys are infuriating to use

Features	★★☆☆☆
Performance	★★★☆☆
Value for money	★★★★★
Overall	★★★☆☆

Asus F5RL

Price £479 **Contact** Asus http://uk.asus.com

Asus submitted its F5R laptop to our £499 group test 11 months ago, and since then very little has changed. It's the same chassis with a similar price, but a slower processor and graphics. It has gained an extra gigabyte of Ram and a slightly larger hard disk (now 200GB), but it raises a serious issue: many laptops on sale today are barely better value for money then they were a year ago.

The chassis of the F5RL is one of the most robust on test, with attractive silver furnishings and a decent strip of shortcut keys. It sticks to the tried and tested 15.4in formula with a solid, if slightly rattling, keyboard and a reasonable trackpad. The bezel is rather thick, but it accommodates a large and adjustable 1.3-megapixel webcam.

It wouldn't run our Mobilemark reader test but managed a respectable 1 hour 44 minutes in our DVD playback test. The 4,400mAh battery is, in theory, capable of more, but the screen or the older RS400 chipset is perhaps not very energy efficient.

The F5RL's Core 2 Duo T5450 1.66GHz processor ensured it languished in the bottom half of our tests this month, while its ATI Xpress 1100 integrated graphics are a better option than integrated graphics from Intel or Sis. They are, however, older and less capable compared with the Radeon 1250 integrated graphics found elsewhere and the Fujitsu Siemen's discrete Radeon HD 2400 chip.

Asus has skimped on the Ethernet, providing the older 10/100Mbits/sec standard, and, like every other laptop in this group test, there's no Draft-N Wifi included as standard.

The F5RL is a sturdy laptop whose £479 price tag is deceptive, but it can't match the Amilo Pi 2540 outside of the catwalk.

Verdict

Pros Attractive; reasonable hard drive capacity

Cons Slow processor; average feature list

Overall The F5RL chassis looks good, but its components are getting long in the tooth

Features	★★★☆☆
Performance	★★★☆☆
Value for money	★★★☆☆
Overall	★★★☆☆

Fujitsu Siemens Amilo Pi 2540

Price £499 **Contact** Tesco 0845 600 4411 www.tesco.com

Vista is the first Windows operating system to implement desktop compositing, where the 2D desktop (with 3D bells and whistles) is rendered on the graphics card. The upshot is that a decent graphics card can really boost performance, which gives the Fujitsu Siemens Amilo Pi 2540 a big boost in our book.

Its Radeon HD 2400 may not be state of the art, but for £499 it is a great inclusion and makes this laptop the only £499 laptop appropriate for high-definition video playback.

The poor result in our test game, Fear, is misleading, since the Radeon HD 2400 was the only graphics card that correctly rendered the game (including water reflections). The rest of the system stands out too, including 3GB Ram and a spacious 320GB hard drive. This, combined with the 2GHz Core 2 Duo T5750 processor and Santa Rosa chipset, ensured it shot to the top of many of our benchmarks.

Its ports and peripherals are more mundane – there are just three USB ports and no Gigabit Lan – but there is a treasured DVI port alongside the analogue VGA.

While the chassis is solid enough, Fujitsu Siemens has committed one major sin in its design: the chassis that surrounds the keyboard is so high relative to the keys that your thumb is likely to whack it every time you use the spacebar. It's also prone to a little bit of distracting rattle, but at least the key layout is very good and accompanies a great touchpad.

As with every laptop here, the maximum brightness of the Amilo Pi 2540's 15.4in screen was excellent. Battery life wasn't a problem either, courtesy of a gutsy 4,400mAh battery. Overall, the Amilo Pi 2540 has great performance and a solid feel to it, which makes it far and away our favourite.

Verdict

Pros Excellent 2D and 3D performance for price; large hard disk; lots of Ram

Cons Only three USB ports; high chassis curb affects keyboard use

Overall This is, without a doubt, the best laptop for £499

Features	★★★☆☆
Performance	★★★★★
Value for money	★★★★★
Overall	★★★★★

Hi-Grade D7000SRL

Price £499 **Contact** Hi-Grade 020 8532 6111 www.hi-grade.com

Hi-Grade's D7000SRL is one of the most desirable laptops. Its LCD backing is a chequered pattern with the Hi-Grade logo classily set into it. Opening it up reveals a pleasant black and grey colour scheme, with slick rounded corners. However, it doesn't have a latch to secure the screen when closed, which is unusual for a laptop this size.

Its edge is littered with excellent ports, including HDMI (the only one here) so it can connect easily to a high-definition TV. With an HDMI/DVI dongle, it's also capable of outputting to DVI monitors.

The D7000SRL is also the only laptop here with Bluetooth included, which is convenient when connecting peripherals such as mobile phones and sat navs. For what it's worth, this is the only model to feature a fingerprint reader, too.

The speakers are loud, but tinnier than the Toshiba's, while the keyboard is fine to type on, although the placing of the function and control keys isn't standard. The touchpad is excellent, with a well-marked scroll section and status lights (such as Wifi status).

Hi-Grade has hit a chord with us on the processor – the Core 2 Duo T5750 is a great inclusion at £499. However, the 120GB hard disk has less than half the capacity of others in the line-up.

PCmark05 performance was good at 4,215, while a big 4,400mAh battery propelled it to first place in our DVD playback test thanks to Intel's frugal integrated graphics.

Intel's X3100 integrated graphics have just been superseded by the Centrino 2 platform, and they aren't much good for gaming or high-definition playback. And it is these integrated graphics, along with the small hard drive and high delivery costs, which mean this model just misses out on a Recommended award.

Verdict

Pros Stylish chassis; good performance; Bluetooth and HDMI

Cons Small hard drive; high delivery costs; no LCD latch

Overall The D7000SRL is a great laptop, and with a few pounds shaved off the price it would be a winner

Features	★★★★★
Performance	★★★★☆
Value for money	★★★☆☆
Overall	★★★★☆

MSI Wind

Price £329.99 **Contact** MSI 020 8813 6688 www.msicomputer.co.uk

With a 10in screen, the MSI Wind isn't far off PC Nextday's Logiq 12.1in display. However, excluding the power adapter, it only tipped our ultra-sensitive scales at a feather-like 1.156kg, which is considerably less than the Logiq.

It has an adequate LED backlit screen, with a much better keyboard than the Asus Eee, but poor placement of the function key. The 1,024x600 screen resolution is also restrictive.

The Wind features an Intel Atom N270 1.6GHz processor, which is the best choice for cheap laptops at the moment, accompanied by a 1GB DDR2 Ram and an 80GB mechanical hard disk. These components result in great Windows XP operation and snappy web browsing and word processing.

The Wind doesn't include Draft-N Wifi or an easy to access Ram slot (both of which feature on the Eee PC 901). Instead, it uses 802.11g and you must remove nine screws and the chassis base to access the Ram slot. One slot is available to use (the preinstalled 1GB Ram is inaccessible) and MSI says your warranty won't be voided if you decide to upgrade – as long as you let it know what you're doing.

Battery life is uninspiring, due to the 2,200mAh battery, but the biggest problem with the Wind is its price. MSI appears to have shot itself in the foot by allowing Advent to rebrand it and sell it at a much more affordable price.

All the criticisms levelled in our review of the Advent 4211 (see page 58) are true here, too. The Wind is more attractive in glossy white, but it's disappointing that the black power supply doesn't match the white chassis.

There's plenty to like about the Wind, but the poor battery really lets it down.

Verdict

Pros Large and comfortable keyboard; large screen; good performance compared with Eee PC
Cons Restricting screen resolution; bottom-left function/control keys poorly laid out; poor battery life
Overall With a bigger battery this would be the perfect miniature notebook

Features	★★★★★
Performance	★★★☆☆
Value for money	★★★☆☆
Overall	★★★☆☆

PC Nextday Logiq 12.1in Laptop

Price £499 **Contact** PC Nextday 0870 609 0125 www.pcnextday.co.uk

At first glance, the Logiq looks like a highly desirable laptop. With a 12.1in screen and compact design, it comes in pink, white, black or, as ours did, an attractive glossy blue finish. It's prone to fingerprints, but we're a fan of its four classy function buttons.

It weighs 2.30kg including power adapter, which is 1kg less than the Toshiba 15.4in laptop. This is quite unimpressive considering the difference in size and is mainly a result of the heavy power adapter. We don't think it's worth weighing laptops without their power adapter because battery life is generally pretty poor at this end of the market. The Logiq was a great example of this, lasting just one hour and 16 minutes in our DVD playback test.

This is partly due to the small 2,200mAh battery, but also because the fan functioned at full speed during all our tests. Consequently, it was also the noisiest laptop in the group.

Most of the Logiq's £499 budget has been spent on an excellent 2.1GHz Core 2 Duo T8100 processor, which uses Intel's new 45nm Penryn architecture. It's a very fast chip (reflected by an impressive Cinebench score of 701) and cool running too, so the noisy fan is likely to be the result of an inefficient cooling system.

Its 250GB hard disk, 2GB Ram, 802.11g Wifi, card reader and 56k modem are all par for the course. Despite space for it on the chassis, there's no built-in webcam.

We appreciate the Gigabit Lan port, but don't rate the Sis Mirage 3 graphics highly, which produced poor image quality in our Fear gaming test.

With a T8100 processor this really is excellent value for money, but it just doesn't make sense to have a compact laptop with poor battery life.

Verdict

Pros Excellent processor; spacious hard drive; compact design
Cons Noisy; poor battery life; very poor 3D performance
Overall An incredibly speedy 12.1in laptop let down by pathetic battery life and a noisy cooling fan

Features	★★★☆☆
Performance	★★★☆☆
Value for money	★★★★★
Overall	★★★☆☆

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Samsung R410

Price £499 **Contact** Samsung 0870 726 7864 www.samsung.co.uk

The R410 has been given Samsung's traditional all-black lick of paint – glossy on the LCD backing and matt on the rest of the laptop. This style of chassis design won't suit all tastes, but with its lack of multimedia or function keys the R410 certainly is a very business-like laptop.

The keyboard is the business too, with a good, firm response and sensible control/function key positioning. And with big arrow keys, it's a tremendous overall design, but some users will prefer more travel in the keys. The screen is clear and comes with a very strong reflective coating, which will make outdoor use on a sunny day extremely difficult.

As with every other laptop here, apart from the MSI Wind, it retains a 1,280x800 resolution. However, since this is a 14.1in laptop it benefits from being slightly lighter, more compact and a little tougher than the 15.4in competition. That said, the screen hinge was a bit loose on our review model.

An Intel Core 2 Duo T5550 running at 1.83GHz is fitted inside. There's also 2GB Ram, which appeared to be running at 690MHz (rather than the traditional 667MHz), courtesy of some bizarre behaviour by the ATI RS600 chipset.

In our benchmarks, the R410 sat in the middle of the field. Although its integrated ATI Radeon 1250 graphics appeared to race ahead in our Fear benchmark, like the other integrated graphics, it didn't render things properly despite our best efforts to ensure a level playing field – specifically the glass and water features.

The smaller screen means the R410 has lower energy requirements and battery life was reasonable as a result. But the lack of a digital video output and just three USB ports, rather than four, is disappointing. Ultimately, the Amilo 2540 is a better buy.

Verdict

Pros Compact chassis; big hard drive; good battery life

Cons Integrated graphics; three USB ports, rather than the standard four

Overall A good-value 14.1in laptop with a slick lick of paint, but not quite as capable as some others

Features	★★★☆☆
Performance	★★★★☆
Value for money	★★★★☆
Overall	★★★★☆

Toshiba Satellite Pro A300D-131

Price £421 **Contact** Toshiba 0870 444 8944 www.computers.toshiba.co.uk

Toshiba has produced some excellent notebook designs in the past year, and the A300D-131 is another robust model. The screen hinge is reassuringly stern and the screen impressively bright. That said, it's a bit clunky and boring in grey.

This is the only AMD-based laptop, using an Athlon 64 TK-57 processor ticking along at 1.9GHz. It's a step behind AMD's new Turion Ultra CPUs and doesn't even get the basic Turion name because it only has a 512KB L2 cache and no support for AMD's virtualisation technology. Curiously, the DDR2 Ram it uses is linked to the CPU so that it runs at 633MHz, rather than the more common 667MHz. Either way, the system didn't do well in PCmark05.

AMD products aren't currently as power-efficient as Intel's, reflected by a poor one hour and 18 minutes of DVD playback time, and this is despite the A300D-131 fitting a chunky 4,000mAh battery.

Corners have been cut to get it £80 under budget – namely the processor and the hard drive (a 120GB model). There's also no webcam, Bluetooth or digital video output. The keyboard is excellent, though, with lots of travel and good clearance next to the rest of the chassis. Indeed, other big-name manufacturers should take a leaf out of Toshiba's book and fit a recessed trackpad since it ensures you don't accidentally move the cursor when typing.

It tipped our scales at 3.35kg including the power adapter, which makes it the second heaviest of the bunch. Like every other Toshiba laptop we've tested lately, the Satellite Pro A300D-131's speakers are in a class of their own and if you listen to music directly from your laptop, the bass response is first class.

Overall, this is a solid laptop, but it suffers from poor performance.

Verdict

Pros Great keyboard and trackpad; solid chassis; bright screen

Cons No webcam; heavy; poor performance; small hard drive

Overall A no-nonsense laptop with a solid, if chunky, construction and good performance for basic tasks

Features	★★★☆☆
Performance	★★★☆☆
Value for money	★★★★☆
Overall	★★★☆☆

£499 notebooks

MANUFACTURER	**ADVENT**	**ASUS**	**FUJITSU SIEMENS**
Model	5313	F5RL	Amilo Pi 2540
Price	£399	£479	£499
Delivery charge (UK mainland)	Free	Dependent on retailer	£4.85
Sales telephone	0844 561 0000	No UK sales number	0845 600 4411
URL	www.pcworld.co.uk	http://uk.asus.com	www.tesco.com
HARDWARE			
Processor	Intel Core 2 Duo T5750 2GHz	Intel Core 2 Duo T5450 1.66GHz	Intel Core 2 Duo T5750 2GHz
Chipset	Sis 672/968	ATI RS400/SB600	Intel GM965/ICH8-ME
Ram	2GB 667MHz DDR2	2GB 667MHz DDR2	3GB 667MHz DDR2
Occupied/spare memory slots	1/1	2/0	2/0
Hard disk manufacturer and model	Fujitsu MHY2200BH	Fujitsu MHY2200BH	WD Scorpio Blue
Hard disk size and speed	200GB 5,400rpm	200GB 5,400rpm	320GB 5,400rpm
Number of Express Card slots	0	1	1
Number of PC Card slots	0	0	0
Number of USB ports	4	4	3
Number of Firewire ports	0	0	0
MULTIMEDIA			
Graphics processor	Sis Mirage 3	ATI Radeon Xpress 1100	ATI Mobility Radeon HD 2400
Graphics processor memory	up to 256MB shared	up to 128MB shared	256MB GDDR2
Screen size and native resolution	15.4in (1,280x800)	15.4in (1,280x800)	15.4in (1,280x800)
Video outputs	VGA	VGA	DVI, VGA
Optical drive manufacturer and model	TSSTcorp TS-L632H	Matshita UJ-860S	Optiarc AD-7590A
Optical formats supported	DVD+/-RW DL, DVD-Ram	DVD+/-RW DL, DVD-Ram	DVD+/-RW DL, DVD-Ram
Soundchip	Realtek HD	Realtek HD	Realtek HD
Speaker setup	Stereo	Stereo	Stereo
OTHER INFORMATION			
Additional hardware	Webcam, Gigabit Ethernet, 2-in-1 memory card reader	Webcam, 2-in-1 memory card reader, 10/100 Ethernet, 56kb modem	Webcam, 3-in-1 memory card reader, 10/100 Ethernet 56kb modem
Wireless networking	802.11b/g Wifi	802.11b/g Wifi	802.11b/g Wifi
Battery capacity (milliamp hours)	2,200	4,400	4,400
Dimensions in mm (wxdxh)	357x257x50	367x265x44	360x270x46
Weight including power adapter (kg)	3.10	3.00	3.45
Operating system	Windows Vista Home Premium	Windows Vista Home Premium	Windows Vista Home Premium
Included retail software	None	None	Cyberpower DV, Microsoft Works 9, Nero 8 Essentials
Standard Warranty (RTB = return to base, C&R = collect and return)	1yr C&R	2yr C&R	1yr C&R
SCORES			
Features	★★☆☆☆	★★★☆☆	★★★☆☆
Performance	★★★☆☆	★★★☆☆	★★★★★
Value for Money	★★★★★	★★★☆☆	★★★★★
OVERALL	★★★☆☆	★★★☆☆	★★★★★

Vendors of group test products are only obliged to sell them at the prices quoted here (which include credit card surcharges) for the life of this PCW issue. They may also change components under certain circumstances.

	HI-GRADE	**MSI**	**PC NEXTDAY**	**SAMSUNG**	**TOSHIBA**
	D7000SRL	Wind U100	Logiq 12.1in Laptop	R410	Satellite Pro A300D-131
	£499	£329.99	£499	£499	£398.33
	£34	Dependent on retailer	£5.99	Dependent on retailer	£11.75
	020 8532 6111	020 8813 6688	0844 800 3650	0870 726 7864	0870 444 8944
	www.hi-grade.com	www.msicomputer.co.uk	www.pcnextday.co.uk	www.samsung.co.uk	www.computers.toshiba.co.uk
	Intel Core 2 Duo T5750 2GHz	Intel Atom N270 1.6GHz	Intel Core 2 Duo T8100 2.1GHz	Intel Core 2 Duo T5550 1.83GHz	AMD Athlon 64 TK-57 1.9GHz
	Intel GM965/ICH8-ME	Intel 945GME/ICH7-M/U	Sis 672/968	ATI RS600/SB600	ATI RS690/SB600
	2GB 667MHz DDR2	1GB 667HMz DDR2	2GB 667MHz DDR2	2GB 690MHz DDR2	2GB 633MHz DDR2
	2/0	0/1	2/0	2/0	2/0
	Fujitsu MHY2120BH	WD Scorpio Blue	WD Scorpio Blue	WD Scorpio Blue	Toshiba MK1245GSX
	120GB 5,400rpm	80GB 5,400rpm	250GB 5,400rpm	320GB 5,400rpm	120GB 5,400rpm
	1	0	1	1	1
	0	0	0	0	0
	3	3	3	3	4
	0	0	0	0	1
	Intel GMA X3100	Intel GMA 950	Sis Mirage 3	ATI Radeon X1250M	ATI Radeon X1250M
	up to 358MB shared	up to 224MB shared	up to 256MB shared	up to 831MB shared	up to 831MB shared
	15.4in (1,280x800)	10in (1,024x600)	12.1in (1,280x800)	14.1in (1,280x800)	15.4in (1,280x800)
	HDMI, VGA	VGA	VGA	VGA	VGA, S-video
	TSSTcorp SN-S082H	None	TSSTcorp TS-L632H	TSSTcorp TS-L633A	Matshita UJ-850S
	DVD+/-RW DL, DVD-Ram	N/A	DVD+/-RW DL, DVD-Ram	DVD+/-RW DL, DVD-Ram	DVD+/-RW DL, DVD-Ram
	Sigmatel HD	Realtek HD	Realtek HD	Realtek HD	Conexant HD Smartaudio 221
	Stereo	Stereo	Stereo	Stereo	Stereo
	Bluetooth, 56kb modem, webcam, 10/100 Ethernet, 2-in-1 memory card reader, fingerprint reader	Webcam, 10/100 Ethernet, 3-in-1 card reader, Bluetooth, Case	56kb modem, Gigabit Ethernet, 2-in-1 memory card reader	Webcam, Gigabit Ethernet, SD card reader, 56kb modem	56kb modem, Gigabit Ethernet, 3-in-1 memory card reader
	802.11a/b/g Wifi	802.11b/g Wifi	802.11b/g Wifi	802.11b/g Wifi	802.11b/g Wifi
	4,400	2,200	2,400	4,000	4,000
	356x259x45	259x179x38	299x223x44	337x251x43	361x265x44
	3.20	1.50	2.30	2.75	3.35
	Windows Vista Home Premium	Windows XP Home	Windows Vista Home Premium	Windows Vista Home Premium	Windows Vista Home Premium
	Nero Essentials 7	None	None	None	Microsoft Works 9, Ulead DVD Moviefactory
	1yr C&R	2yrs C&R	1yr RTB	1yr C&R	1yr C&R
	★★★★★	★★★★★	★★★☆☆	★★★☆☆	★★★☆☆
	★★★★☆	★★★☆☆	★★★☆☆	★★★★☆	★★★☆☆
	★★★☆☆	★★★☆☆	★★★★★	★★★★☆	★★★★☆
	★★★★☆	★★★☆☆	★★★☆☆	★★★★☆	★★★☆☆

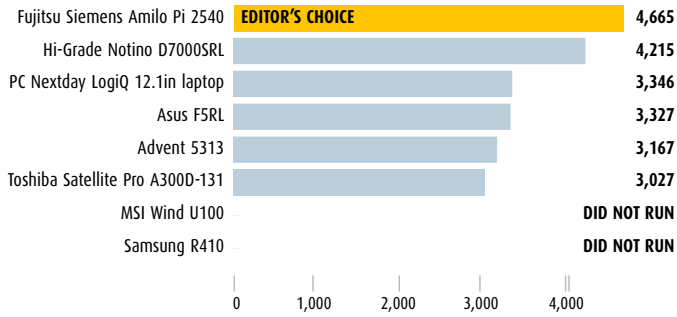
Vendors of group test products are only obliged to sell them at the prices quoted here (which include credit card surcharges) for the life of this PCW issue. They may also change components under certain circumstances. ↘

Lab results

The Fujitsu Siemens Amilo's impressive spec ensured it performed extremely well in most of our benchmarks, especially 3Dmark05

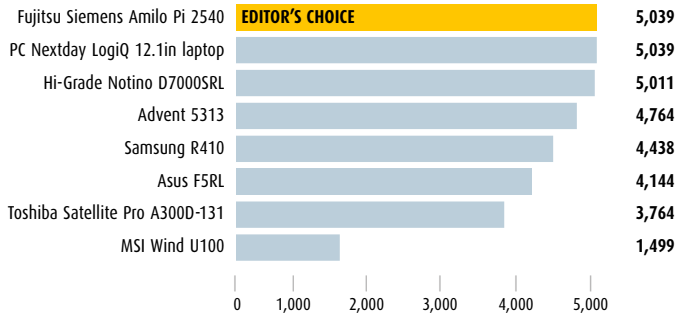
PCmark05 (overall – 1,024x768)

(bigger is better)



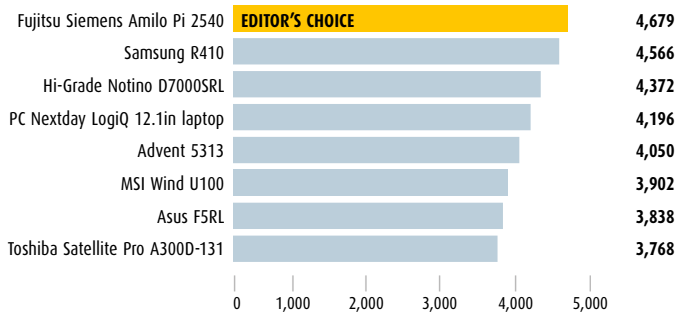
PCmark05 (CPU)

(bigger is better)



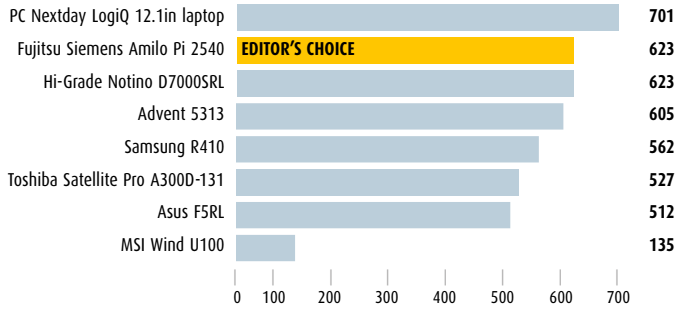
PCmark05 (hard disk)

(bigger is better)



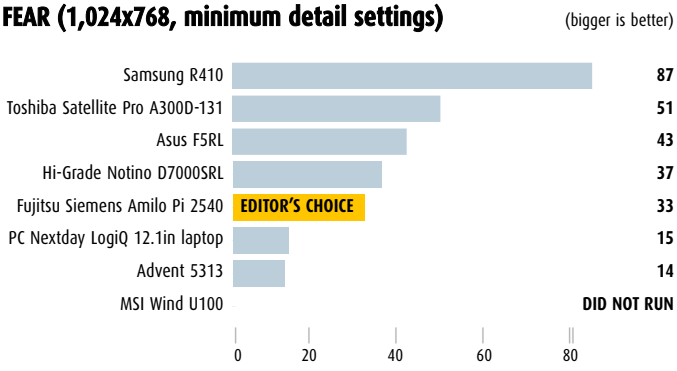
Cinebench 9.5 (multi CPU)

(bigger is better)



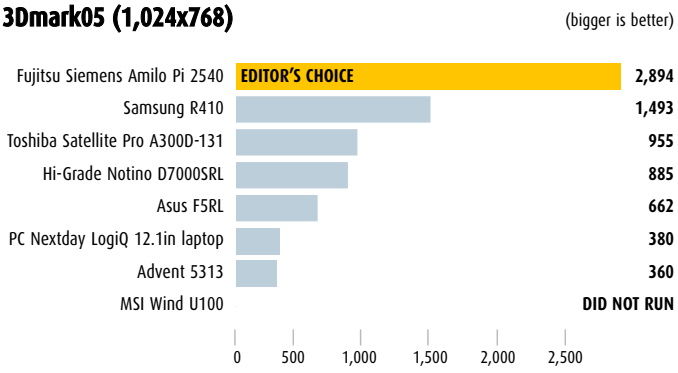
FEAR (1,024x768, minimum detail settings)

(bigger is better)



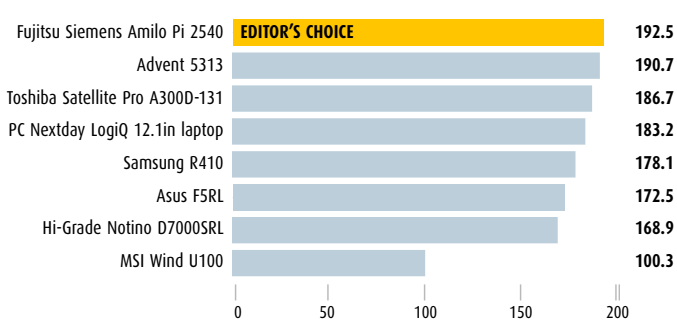
3Dmark05 (1,024x768)

(bigger is better)



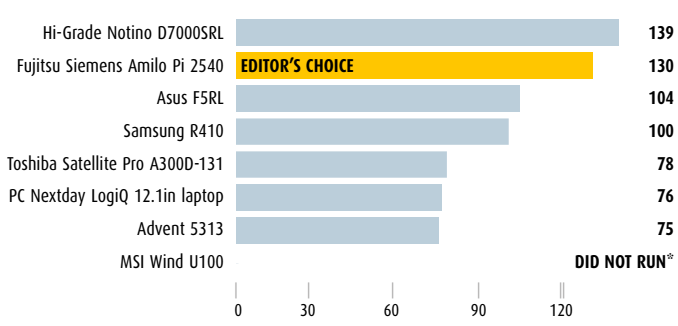
Screen brightness (cd/m2)

(bigger is better)



Mobilemark 2007 DVD playback (mins)

(bigger is better)



*MSI Wind wouldn't run Mobilemark, but lasted two hours 10 minutes when reading a PDF

The second-hand alternative

The rate at which a computer's value depreciates can be severe, but as there's no regulated market for used hardware, there are no official guides to second-hand value.

Laptops have historically held their value a bit better than their desktop counterparts since they tend to have a longer lifecycle, and a slower rate of technology change makes them become obsolete less quickly. There's also an environmental incentive to use laptops for longer, rather than just recycle them and buy a new model.

A report by Environmental Futures (**www.environmentalfutures.org**) calculated that reselling or upgrading computers saves between five and 20 times more energy over the computer's life cycle compared with recycling, because recycling is actually fairly energy-intensive.

Producing silicon-based electronics is much more energy-intensive, though. A report from the United Nations university showed that the energy required to build one computer produces around 480kg of carbon dioxide (based on coal power plants), which is 100kg more than Volvo claims it produces for every car it manufactures.

Since the UK's average energy use sits at about 9,000kg carbon dioxide emissions per person per year, a new desktop PC or laptop can represent a significant portion of that. If you are considering a used laptop, before you rush onto Ebay and buy something that may not come with a warranty, you should be aware of the alternatives that can offer some peace of mind.

Big companies with a fleet of corporate laptop designs are the biggest source of refurbished laptops, so it's no surprise that Dell has its very own reselling department (**www.dell.co.uk/outlet**).

MSCom, (**www.mcscom.co.uk**), Sterling XS, (**www.sterlingxs.co.uk**), Laptopshop.co.uk (**www.laptopshop.co.uk**) and Morgan (**www.morgancomputers.com**) are other big names that deal in refurbished and surplus laptops. In Morgan's case, the company has been selling kit for more than 25 years and provides a range of standard warranties.

Ultimately, it is the warranty that suffers with second-hand goods. While EU legislation commits sellers to provide a 12-month warranty with all new electrical goods, second-hand goods don't have the same protection. What's more, private sellers are only obliged to ensure they accurately describe their product, whereas retailers have more stringent obligations under the Sale of Goods Act.

Many big-name companies deal in refurbished laptops, which may be preferable to buying a used one online privately

Editor's Choice

Editor's Choice Fujitsu Siemens Amilo Pi 2540

Fujitsu Siemens Amilo Pi 2540

There was only one laptop with a discrete graphics card this month, and it managed to include this without having to make cuts elsewhere. But it wasn't just a graphics card Fujitsu Siemens managed to squeeze into its Amilo Pi 254 – the company also managed to lavish cash on an extra gigabyte of Ram and a fast processor.

Performance was excellent for the price and battery life isn't too shabby either, easily lasting the length of an average DVD movie. What's more, the Amilo Pi 2540 is an ideal candidate for making home movies and storing piles of digital media, thanks to its spacious 320GB hard drive. Thanks to the Radeon HD 2400 graphics card it's the only laptop capable of playing a few older games at decent frames rates.

It's definitely not the best laptop for typing – we're always astonished when a big manufacturer such as Fujitsu Siemens gets the keyboard design wrong, so that you are impeded when you want to use the spacebar. There's also no Gigabit Ethernet, but otherwise this is an astonishingly good-value laptop.

An irritation with many laptops is the amount of trialware you must uninstall before you can get going. The Fujitsu Siemens was a particularly bad offender, installing many of Google's applications as well as programs such as Pokerstars 2, for example.

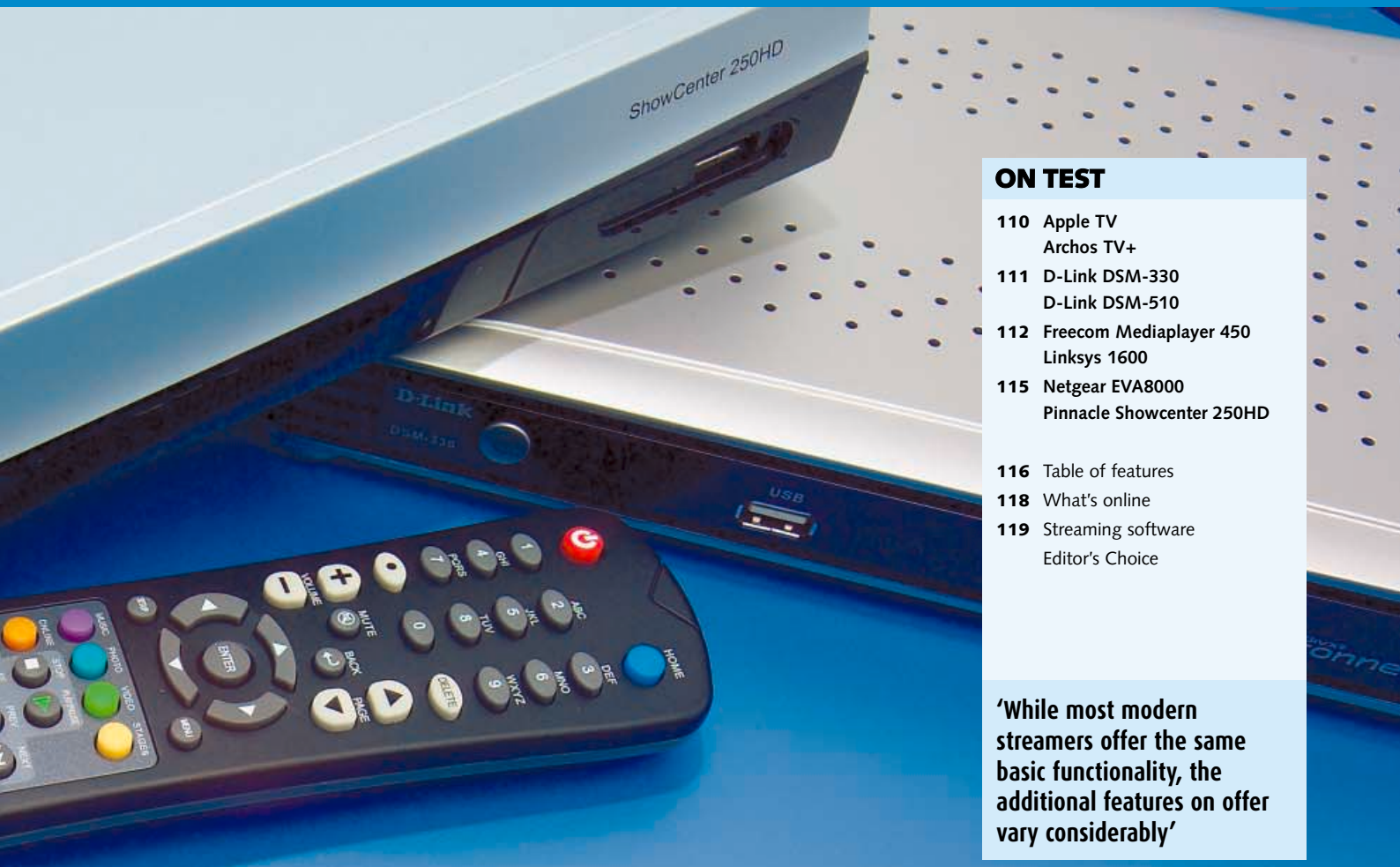
We accept that Office 2007 and anti-virus trial software will always be a part of a new laptop since manufacturers stand to make money out of such deals but, to us, gambling software just seems like a step too far.

As for the rest of the group, they didn't fare well in terms of features and value for money. It is, however, interesting to see how the MSI Wind fares against laptops that are just £100 more expensive – it's a lot lighter, but doesn't have much better battery life (it lasted just over two hours in our DVD reader test with the Wifi turned off) and performance in multimedia-intense applications is miles behind bigger laptops.

If you want a small, ultraportable laptop, we continue to recommend the Asus Eee PC 901, the bargain £220 Acer Aspire One or the Advent 4211 (read a review on page 58).

'We're always astonished when a big manufacturer gets the keyboard design wrong'

pinnacle
D-Link
DSM-330
FREECOM
ARCHOS
TV
OK
ARCHOS | TV+



ON TEST

110 Apple TV
Archos TV+
111 D-Link DSM-330
D-Link DSM-510
112 Freecom Mediaplayer 450
Linksys 1600
115 Netgear EVA8000
Pinnacle Showcenter 250HD

116 Table of features
118 What's online
119 Streaming software
Editor's Choice

'While most modern streamers offer the same basic functionality, the additional features on offer vary considerably'

Stream machines

Paul Lester gets up close and personal with the latest media streamers that promise to set your digital movies, music and photos free

If you're a fan of home cinema and haven't come across media streaming yet, you're missing out on what will almost certainly be the future of home entertainment. Streamers allow you to view video, audio and photos stored on your home PC through a television or hifi, and with more people starting to download audio and video from websites such as iTunes and BBC iPlayer, the convenience of storing and viewing collections in this way is clear to see.

Despite a shaky start, media streamers now perform very well. Installation is now usually a fairly painless process, and most feature HDMI connectivity for high-definition TVs.

Their primary purpose is to offer access to media libraries stored on a home computer through a television, but many now offer extra features, such as the ability to browse and view content from websites like Youtube, listen to internet radio, and even record video from a source device such as Sky set-top box so you can start expanding your collection.

While most modern streamers offer the same basic functionality, the additional features on offer vary considerably, as do factors such as usability, media management and file support. In this group test we take a close look at eight of the best devices on offer to see how well they perform, what extra advantages they bring and how much you're getting for your money to offer you the best advice for bringing the future of digital media into the home.

Apple TV

Price £200 **Contact** Apple 0800 048 0408 www.apple.com/uk

No media streaming group test would be complete without a look at the Apple TV, and now iTunes is increasing the amount of video content available in the UK we wouldn't be surprised if it experiences something of a second-coming.

As expected, the device is stylish and minimalist in design, but it only offers HDMI and component outputs for video – and this is just the start of the restrictions it places on media playback. Setting up the Apple TV is easy enough if you have a compatible router, although we had issues with a couple we tested – when we called Apple support we were simply told to pick up one of its own Airport Express devices, which has obviously been thoroughly tested. When you do get the process started you're required to synchronise it with iTunes by entering a supplied code. Once done you'll then have the choice of either copying content from your iTunes library to the Apple TV's hard disk or streaming it directly from your computer.

Copying takes some time, but it's the only device on test that allows you to populate an internal drive across a network.

The interface is particularly appealing and makes it easy to access media for playing back. Performance is impressive over a wireless connection for standard-definition content and while high-definition is watchable it did struggle at times; you are better off copying HD content directly to the device's hard disk.

In addition to local content and that available through the iTunes store you can also access other online services, including Youtube and Flickr, and while streaming performance varied here it's still usable. Apple TV also has support for the latest 802.11n wireless standard, although your PC and router will also need to be 802.11n to take advantage of this.

Verdict

Pros Excellent interface; impressive streaming performance; compact and stylish

Cons Poor format support; reliant on iTunes; router compatibility problems

Overall Its dependence on iTunes is a little restrictive, but it also makes it easy to use and something Apple fans will leap at

Features	★★★☆☆
Performance	★★★☆☆
Value for money	★★★☆☆
Overall	★★★☆☆

Archos TV+

Price £169.99 **Contact** Archos www.archos.com

Better known for its portable media players, it's perhaps no surprise the Archos TV+ exhibits many of the features found on its 605 Wifi handheld viewer.

The silver box is rather chunky, but it's a stylish enough design and houses a range of connections including component, composite, S-video and HDMI. Despite its HDMI connection, the TV+ is the only device on test that doesn't support high-definition playback, instead relying on a maximum resolution of 576p. The lack of HD support might put some users off, but there are plenty more tricks up Archos' sleeve to compensate.

Setup is very straightforward and it uses Windows Media Player's library and media sharing to access to content on your PC. You can also share folders across a network using Windows' built-in sharing tools or, if you prefer, store everything on the drive's 80GB internal hard disk. Whichever you choose, content is quick to load, very responsive in terms of playback and there's a good degree of control including aspect ratio and play speed adjustment.

Streaming is just part of the TV+'s arsenal and, if you purchase the optional plug-in, you can use it to browse the web. Other features, such as games, widgets and media from the Archos content portal, boost its appeal. The device also acts as a PVR and can schedule recordings, although you'll need to hook it up to a source such as a Freeview tuner or Sky receiver since there's no built-in tuner.

Accessing all of these features is straightforward thanks to the clear interface, but the Qwerty remote, which includes a mouse control, does take a bit of getting used to. If you're not fussed about streaming HD video, the Archos TV+ has plenty to offer.

Personal Computer World RECOMMENDED

Verdict

Pros Built-in web-browser, PVR functionality, good interface, responsive playback

Cons Doesn't support HD content; plug-ins cost extra

Overall Despite the lack of HD support the sheer range of other features makes the TV+ an appealing streamer

Features	★★★★☆
Performance	★★★★☆
Value for money	★★★★☆
Overall	★★★★☆

D-Link DSM-330

Price £135 **Contact** D-Link 0208 955 9000 www.dlink.co.uk

D-Link teamed up with DivX to produce the DSM-330, originally offering access to DivX's Stage6 video download portal. This service is no longer available, but the hardware still has lots to offer. It's primarily a media streamer, but you can also access local content by connecting a USB drive to the port on the front. You'll find an HDMI output, along with composite and Scart for older screens, and both wired and 802.11g wireless options for networks.

Hooking the DSM-330 up is easy thanks to the setup wizard. Media files are shared using the provided DivX connected software, which allows you to choose specific folders on your computer that contain videos, music and photos. Files are processed on your machine before being sent to the streamer, so those with slower computers may have performance issues, though you're unlikely to be using your PC at the same time anyway. This process means streaming performance is very good, both for standard and high-definition content, with support for up to 720p resolutions over a standard wireless connection. Although there is a short delay before playback begins, we found the overall media control to be very responsive.

The DSM-330 also has the most vibrant and innovative interface of the streamers on test and creates thumbnail previews of album art or video stills on-screen as you highlight various folders. You can also switch views to make large collections more manageable or cut down on processing time.

Minor issues include the lack of a visual volume control indication and the fact that there's no ability to adjust the aspect ratio. We also thought the supplied remote control could have been more intuitively laid out. But, overall, this is a decent media streamer.

Personal Computer World EDITOR'S CHOICE

Verdict

Pros Excellent interface; impressive performance; effective software; compact design

Cons Lack of additional features; minor control issues

Overall Not much in terms of additional features, but usability is excellent and it's great value

Features	★★★☆☆
Performance	★★★★☆
Value for money	★★★★★
Overall	★★★★☆

D-Link DSM-510

Price £170 **Contact** D-Link 0208 955 9000 www.dlink.co.uk

Despite the similar name, this player is very different to D-Link's DSM-330. It's also one of the most compact streamers on test and only features HDMI and composite video outputs. There's no internal storage, but you can connect USB-based drives via a port on the front and you have a choice of both wired and wireless connectivity for streaming. Setup is pretty straightforward and once hooked up to a network you can use Windows Media Player 11's media-sharing features to access files that are stored in your library. Alternatively, you have the option to access shared folders across a network, though this didn't work quite as well during testing and we found browsing in this way to be rather sluggish at times.

With support for 720p resolution you'll be able to access HD video, and streaming performance is very impressive across the board, even over our 802.11g wireless connection; as with all the devices here, if your wireless network isn't running at top speed you'll have to switch to a wired connection for HD. There's good format support and, provided you keep everything well tagged and organised on your PC, there's a good degree of accessibility.

In addition to general media streaming and playback the device offers access to online services such as ESPN, Yahoo and Napster, however, you'll need a Viiv-certified PC to access this content. Although these features help to justifying the rather high price, those without a Viiv PC will be paying over the odds for what is essentially a rather basic streamer.

The minor niggles with playback control, access and the rather basic interface means that while perfectly capable, there's not really enough about the D-Link DSM 510 to recommend it over some of the rivals available today.

Verdict

Pros Impressive performance; some good extra features

Cons Rather basic; online features require a Viiv PC

Overall Performs well, but the interface is uninspiring and there are usability issues

Features	★★★☆☆
Performance	★★★★☆
Value for money	★★★☆☆
Overall	★★★☆☆

Freecom Mediaplayer 450

Price £149.99 **Contact** Freecom 01423 704700 www.freecom.com

With a short but successful history in the media streaming market, Freecom has been updating its range by adding HDMI connectivity and internet radio. The Mediaplayer 450 is a bit dated in terms of design, but its rather bulky dimensions do allow you to fit a 3.5in Sata hard drive so you can keep all of your media stored locally.

Alternatively you can use the USB port at the back to plug in a portable hard disk as well as streaming from a PC across a network; it has an 802.11g wireless connection as well as an Ethernet port.

Freecom's streamer is one of the easiest to set up here. We did have some issues getting a signal through the HDMI connection, but we found sharing content from our test PC's hard drive was as simple as sharing folders within Windows.

Although the interface is straightforward, it can be awkward to browse large collections. We also had some issues with file support and playback that didn't occur on the previous model, so it's a bit disappointing Freecom seems to have taken a backwards step here.

Once we got everything streaming properly, performance was excellent and among the best on test. Standard definition worked flawlessly and even HD video was handled well over the 802.11g wireless connection. What's more, Freecom's model is the only unit to support full 1080p HD video.

Controls are responsive during playback, and there's a good array of options to manage the audio stream, adjust the aspect ratio and view subtitles. There are also extras such as internet radio, the ability to access files stored on an FTP server and a degree of control over the theme used for the interface.

Verdict

Pros Very easy to use; impressive performance

Cons Some format compatibility issues; lack of additional features

Overall Despite excellent performance in the streaming stakes, Freecom's player feels dated and suffers from some compatibility issues

Features	★★★☆☆
Performance	★★★★☆
Value for money	★★★☆☆
Overall	★★★☆☆

Linksys 1600

Price £220 **Contact** Linksys 0800 068 0327 www-uk.linksys.com

It's been around for some time now, but the Linksys 1600 was fairly successful on initial release and, after a series of firmware updates, we were keen to see how it coped in comparison to more modern rivals.

It's a little different from most of the others on test in that it includes a DVD player; this upscales standard DVDs to HD resolution, though it's no substitute for a Blu-ray drive. There's a good range of connectivity with Scart and composite for older screens, HDMI, component and digital (optical and coaxial) audio outputs for surround sound.

Setting things up is pretty straightforward using the built-in wizard, which will configure your hardware to connect to a wired or wireless network. You can watch media either via the DVD player, attached USB storage containing files or by streaming from a PC using Windows Media Player 11 or the supplied PC Link software, so you can either maintain a media library within WMP or choose individual folders on the fly via Linksys' software.

Processing is done at the streamer end so, unlike D-Link's DSM-330, it won't hog resources on your computer. However, with the Linksys this also means streaming isn't quite as fluid; files start playing almost instantly, but pausing or rewinding the first couple of times requires it to buffer content. However, in the main things go pretty smoothly with standard-definition (SD) video over wireless, but if you're looking to stream HD files you will need to use the wired connection.

In addition to streaming, the DVD upscaler makes a noticeable difference to SD discs and you'll find online resources such as news, weather, internet radio and a selection of games. It's a shame Linksys didn't work in video streaming from sites such as Youtube, but perhaps we'll see this in a future update.

Verdict

Pros Upscaling DVD player; online features; easy to browse and manage media

Cons Buffer delays; expensive if you won't use the DVD player

Overall If you'll make use of the upscaling DVD player, the 1600 is decent option

Features	★★★★☆
Performance	★★★☆☆
Value for money	★★★★☆
Overall	★★★★☆

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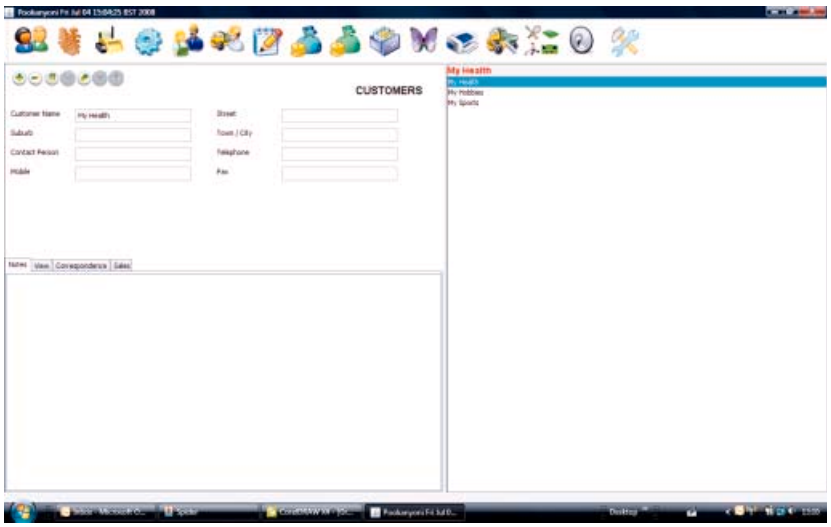
* Set Security Access & Permissions



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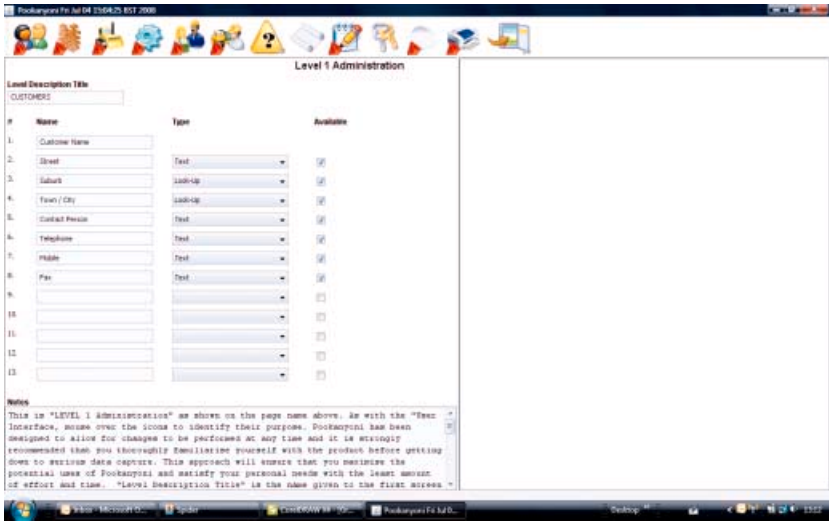

Typical Applications

* Planned Maintenance
* Hobbies
* Wildlife Research & Conservation
* Asset / Insurance Register
* Health & Fitness Performance
* Animal, Bird & Fish Breeding Programs
* Sports & Music Enthusiasts
* Providing Catalogues
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Netgear EVA8000

Price £210 **Contact** Netgear 01344 458 200 www.netgear.co.uk

This streamer from Netgear was released more than a year ago and, despite offering bags of potential, ultimately let itself down with poor performance and an awkward interface. Several major firmware updates later it has been noticeably improved, so we were keen to see how it would perform against the latest devices.

At around the size of a DVD player it's certainly not the most compact of streamers, but does offer HDMI, wireless access and a USB input for external hard drives and USB memory sticks.

Setting everything up is easy. Netgear encourages the use of its own Digital Entertainment software to help you share folders and manage your media, but you can also share using Windows' own folder settings.

The interface has been updated and is far more responsive than it used to be, but bearing in mind the massive array of features on offer we're still disappointed at how basic it is. Because of this, large collections of music, videos or photos aren't particularly easy to browse unless you use the tagging software supplied to label your files with information such as genre, actor or director.

Elsewhere there's the ability to browse and stream Youtube video direct to the device, which is responsive and quick to access. You can also browse photos via Flickr, listen to internet radio, podcasts and set up RSS feeds. All of these features are well organised and easy to browse, catalogue and create favourites for, and it's the most capable streamer on test in this respect.

Format support is impressive, as is performance in terms of streaming media, even high-definition video worked well over our 802.11g wireless connection. And, despite the occasional pause for buffering, playback is very responsive.

Verdict

Pros Excellent range of features; good performance and playback control; impressive format support

Cons Basic interface; awkward to browse large collections; pauses for buffering

Overall If you're willing to invest time getting used to the software, this streamer will serve you well

Features	★★★★★
Performance	★★★★☆
Value for money	★★★☆☆
Overall	★★★★☆

Pinnacle Showcenter 250HD

Price £129 **Contact** Pinnacle 01753 655 999 www.pinnaclesys.com

A rather bland-looking device, the Showcenter 250HD won't win any design awards, and despite offering 720p HD support, it rather glaringly omits an HDMI port. You'll have to use the component output if you want to watch HD and wire up the audio separately – both digital and analogue audio is offered.

When you start the Showcenter up you're greeted by a rather unfriendly interface to help you configure a network connection. Although setup is fairly easy, we had a number of problems establishing a link to our PC and had to forward a range of ports before a server was recognised. This isn't something you'd want to do unless you know networks pretty well, and considering the device uses a generic server in Windows Media Player 11 we were surprised to find so many problems.

When up and running you're guided to a more attractive interface in which to access your photos, videos and music. However, we found navigating around the pages to be rather sluggish, with a long delay when switching folders.

With all of these issues you'd expect streaming performance to be poor, but this device does quite well. We tried a range of content and found most played without issue; buffer time was generally short and playback responsive. HD content didn't fare too well over a wireless connection, though, so expect to have to utilise a wired setup to make this watchable.

Video control is reasonable, with aspect ratio adjustment and a skip facility that allows you to use the numeric keypad on the remote to browse through a video file in 10-per-cent increments. The remote control itself is unnecessarily bulky, though, and it's difficult to work out what many of the shortcut keys do without a bit of trial and error.

Verdict

Pros Decent format support and standard definition streaming

Cons Poor interface; stability issues; problems with network support; no HDMI

Overall Despite decent streaming performance, the unattractive interface, poor usability and limited set of features really hold it back

Features	★★☆☆☆
Performance	★★★☆☆
Value for money	★★☆☆☆
Overall	★★☆☆☆

Media streamers

Manufacturer	APPLE	ARCHOS	D-LINK
Model Name	Apple TV	TV+	DSM-330
Price (inc. Vat)	£200	£169.99	£135
Sales Telephone	0800 048 0408	N/A	0208 955 9000
URL	www.apple.com/uk	www.archos.com	www.dlink.co.uk
Specifications			
Audio formats (*Optional plug-in required)	MP3, WAV, AAC (DRM), Apple Lossless, AIFF	MP3, WMA (DRM), WAV, AAC*, AC3*	MP3, WMA
Video formats	H.264, MPEG-4	WMV, H.264, MPEG-2*/4	MPEG-4, WMV
Photo formats	JPEG, BMP, PNG, TIF, GIF	JPEG, BMP, PNG	JPEG, BMP
Video connections	HDMI, component	HDMI, component, S-video, composite	HDMI, S-video, component, composite, scart
Audio connections	Analogue, digital (optical)	Analogue, digital (coaxial)	Analogue, digital (coaxial/optical)
Maximum video resolution	720p	576p	720p
UPnP	✔	✔	✔
Internal hard drive	40GB	80GB	N/A
USB port	✔	✔	✔
Wireless standard	802.11n	802.11g	802.11g
Wired connection	10/100Mbits/sec	10/100Mbits/sec	10/100Mbits/sec
Size (wxdxh in mm)	197x197x28	250x164x37	162x260x35
Weight	1kg	1.3kg	0.6kg
SCORES			
Features	★★★☆☆	★★★★☆	★★★☆☆
Performance	★★★☆☆	★★★★☆	★★★★☆
Value for Money	★★★☆☆	★★★★☆	★★★★★
Overall	★★★☆☆	★★★★☆	★★★★☆

	D-LINK	FREECOM	LINKSYS	NETGEAR	PINNACLE
	DSM-510	Mediaplayer 450	1600	EVA8000	Showcenter 250HD
	£170	£149.99	£220	£210	£129
	0208 955 9000	01423 704 700	0800 068 0327	01344 458 200	01753 655 999
	www.dlink.co.uk	www.freecom.com	www-uk.linksys.com	www.netgear.co.uk	www.pinnaclesys.com
	MP3, WMA (DRM), Ogg Vorbis, WAV	MP3, WMA, Ogg Vorbis, WAV	MP3, WMA, Ogg Vorbis, WAV, AAC, Audio CD	MP3, WMA, WAV, AAC, FLAC	MP3, WMA (DRM), WMA Pro, WAV
	MPEG-1/2/4, WMV,	MPEG-1/2/4, WMV	WMV, MPEG-1/2/4, H.264	MPEG-1/2/4, WMV	MPEG-1/2/4, WMV
	JPEG, BMP, PNG, TIF, GIF	JPEG	JPEG, BMP, PNG, GIF	JPEG, BMP, PNG, TIFF	JPEG, PNG
	HDMI, composite	HDMI, component (HD), S-video, composite	HDMI, component, S-video, composite, scart	HDMI, component, S-video, composite. scart	Component (HD), S-video, composite, scart
	Analogue, digital (optical)	Analogue, digital (coaxial/optical)	Analogue, digital (coaxial/optical)	Analogue, digital (coaxial/optical)	Analogue, digital (coaxial/optical)
	720p	1080p	720p	1080p	720p
	✔	✔	✔	✔	✔
	N/A	N/A (Sata drive bay included)	N/A	N/A	N/A
	✔	✔	✔	✔	✔
	802.11g	802.11g	802.11g	802.11g	802.11g
	10/100Mbits/sec	10/100Mbits/sec	10/100Mbits/sec	10/100Mbits/sec	10/100Mbits/sec
	139x144x33	57x150x185	230x345x55	51x432x254	230x300x40
	0.8kg	1kg	2.2kg	2kg	2.4kg
	★★★☆☆	★★★☆☆	★★★★☆	★★★★★	★★☆☆☆
	★★★★☆	★★★★☆	★★★☆☆	★★★★☆	★★★☆☆
	★★★☆☆	★★★☆☆	★★★★☆	★★★☆☆	★★☆☆☆
	★★★☆☆	★★★☆☆	★★★★☆	★★★★☆	★★☆☆☆

What's online?

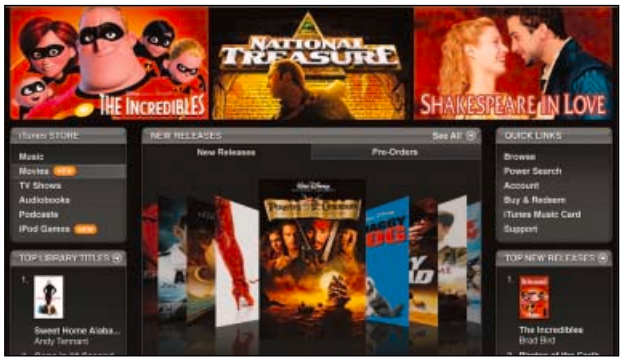
As well as streaming from a home network, many media streamers offer access to online services. You can stream or download videos, movies, music and photos, and other resources such as weather forecasts, news websites or internet radio stations are also on offer.

The services available to you will depend on the streamer you have and they're often seen as a little more than bonus features. Indeed, the lack of premium online content is surprising given that most homes now have broadband connections. Previously music-only, Apple's iTunes store now offers TV shows and films to buy, while Archos has its own content portal. However, the selection of premium content is pretty meagre and, at present, most of the online services available via media streamers are free. Services are often made available via firmware updates or plug-ins, so it's always worth keeping an eye on the official product page for your media streamer.

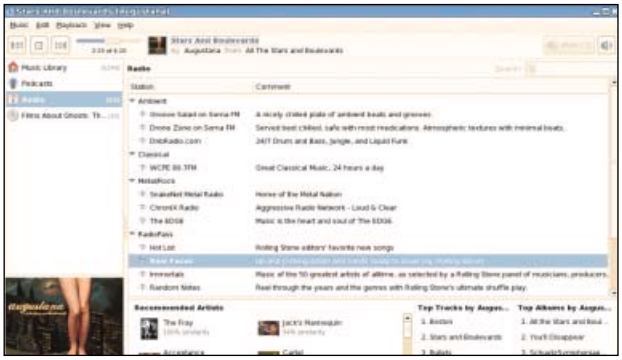
Being the largest source of free video on the internet it makes sense to offer access to Youtube from devices such as media streamers. Three of those on test here can be used to browse video in this way, the Netgear EVA8000, Archos TV+ and Apple TV.

An online photo-sharing service compatible with the Apple TV and Netgear EVA8000, Flickr allows you to view images you've uploaded to the service through your television screen. You can also browse your friends' collections and the .Mac Web Gallery using the Apple TV remote.

In addition to digital media downloads, you'll also find that some streamers offer access to online gaming portals such as Funspot. You'll find this functionality available with both the D-Link streamers featured in this group test and, while the titles on offer are basic, there are some classic games here that should keep you entertained.



Most people have heard of iTunes, but you may not be aware that it has recently started offering downloads of video content such as full movies and TV shows in the UK. iTunes can be accessed directly from the Apple TV device, expanding the range of potential media you have available to you to its entire catalogue



The range of internet radio stations available is huge, and many modern streamers offer access so you can browse and listen to content through your TV or home stereo. Freecom, Netgear, Archos, Pinnacle and Linksys are all capable of streaming a range of stations to the home.

Archos' Content Portal is, as the name suggests, unique to Archos devices. It offers quick access to movies, TV shows and music from your device. You can download via Wifi direct to the streamer though there's usually a fee involved that varies according to the type of media.

Streaming software

When you set up a streamer on a home network you'll need to make sure the media you want to share is accessible, and there are a range of ways in which you can do this. One of the most common is to use Windows Media Player 11's media library, which acts as a UPnP server and makes any catalogued content accessible to a device that's compatible across a network.

However, this isn't always the most straightforward method since, depending on the setup of your PC and home network, you may need to manually forward ports to make your PC visible to external hardware. If you're not experienced in managing firewall settings and home networks this can be difficult to do, and while some products will work straight away it's preferable to have another option.

The other issue with using Windows Media Player is that large collections often take a long time to catalogue and update, and since Windows runs a service within your operating system to do this for you it can begin to hog resources if you're constantly adding new content to your library.

Other methods of media sharing usually come in the form of proprietary software on an installation disc with the package. Both D-Link's DivX Connected and Netgear's EVA8000 allow you to choose which folders to share manually and include settings to fine-tune the way your streamer behaves, including settings resolutions and frame rates or managing multiple devices for different rooms in the home.

The most straightforward method, but not necessarily the tidiest, is to manually share folders on your system using Windows' own sharing tools. Provided your streamer can gain access in this way, it's a quick and easy method for making new files accessible and ensures that you'll maintain the folder structure present on your PC, which can help in organising large collections into manageable chunks.

Most devices are also capable of accessing content stored on a network attached storage drive. Although this means you don't need to have a PC on to access content, browsing becomes harder since there's usually no software to catalogue your various media files, leaving you to trawl through directories.

If you want to avoid streaming altogether most will let you attack USB memory sticks or hard drives, while both the Apple TV and Archos TV+ house internal hard drives.

Editor's Choice

Editor's Choice D-Link DSM-330
Recommended Archos TV+ • Netgear EVA8000

D-Link DSM-330

Archos TV+

Netgear EVA8000

One factor we noticed about almost all of the media streamers in this group test is that both standard definition performance and format support is very good across the board when using an 802.11g wireless network. Some were even able to stream our HD test files over 802.11g, although if your network isn't running at top speed you will need to switch to a wired connection for such content.

Apple TV was the only device here to feature built-in 802.11n, but it will have little effect unless both your router and PC are also 802.11n compatible.

Along with performance, we paid close attention to stability, ease of use, extra features and value for money – all of which varied a great deal.

Despite decent overall performance from many of the contenders, it ended up as a three-way battle for the Editor's Choice award, and which one is best for you will depend very much on your particular needs.

The Archos TV+ has an excellent range of features and only drops points through its lack of HD support and cost of the extra plug-ins. It's the only streamer on test that allows you to browse the internet through a regular browser (although this requires one of the premium plug-ins) as well as offering PVR functionality with the built in hard drive.

The DivX Connected DSM-330 from D-Link is the best streamer on test in terms of sheer performance, offering the most attractive interface and straightforward control over your media files. The lack of extra features here means that it won't appeal to those who want to be able to listen to internet radio or browse online video, but being among the cheapest on test there's clear appeal here if media management is your sole aim.

The surprise contender in the test is Netgear's EVA8000. On initial release it suffered from far too many performance and usability issues, but a variety firmware upgrades have resolved many of these problems. While it's still not nearly as easy to use as we'd like, the extra features on offer make up for its awkward management of large collections.

It's difficult to choose a winner but, since the focus here is on media streaming, we're opting for D-Link's DSM-330 due to it offering an excellent combination of performance, value for money and usability. **PCW**

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BUSINESS

BREAK THE BARRIER

English may be the language of business, but with the spread of the internet, there's an increasing need to be able to understand what customers, competitors and partners in other countries are saying. In this month's business section, we look at how translation software, tools and services can help, including what's on offer and how you might expect it to do for you. We also review a new service designed to deliver Microsoft Office over the internet, plus a DIY surveillance solution that lets you keep tabs on your office from your mobile. Data security is the focus of a small-business package from Trend Micro and we also review one of the first Power-over-Ethernet hubs to support the draft PoE Plus high-power standard. Finally, we look at a neat little network storage appliance from Synology, which does more than just share files.

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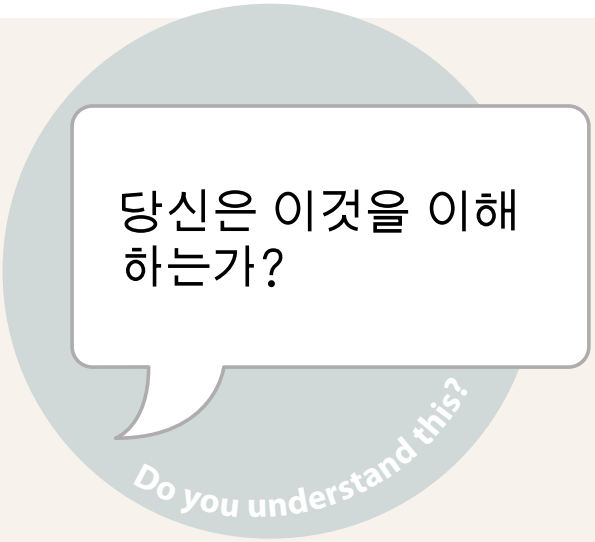


Deliver more power over your Lan with the Powerdsine 7000G High Power, page 129

OUR SCORING

Excellent ★★★★★ **Very good** ★★★★☆ **Good** ★★★☆☆ **Below average** ★★☆☆☆ **Poor** ★☆☆☆☆

OUR AWARDS

Editor's Choice: The best product in a comparative group test. Anything that wins this award is of better quality than its competitors.
Recommended: A product that combines great features, usability and value for money.
Great Value: Not the best in class, but a product that has superior features and performance for the price.

Editor's Choice Business

Recommended Business

Great Value Business

The business awards are used for products that are more suited to home offices or small businesses.

'It gave impressive results on a par with high-end Nas servers costing much more'
Read the review on page 130

Translate web pages

Never before have so many websites been incomprehensible to so many people. Now, though, it's easy to translate foreign-language sites, explains Stephen Copestake

As one more step in its "efforts to foster multilingualism as a key part of European unity in diversity", the European Commission recently announced it would make available its "collection of about one million sentences and their high-quality translations" to translation service developers (**www.tinyurl.com/ywm4g8**). This should provide them with a welcome boost, which is just as well, since business has never had more need to translate text.

Of course, commercial organisations have always had a strong imperative to translate foreign languages. This led to the existence of language schools such as Berlitz (**www.berlitz.co.uk**), founded some 130 years ago, and Linguaphone (**www.linguaphone.co.uk**), which specialise in teaching a working knowledge of a language in a reasonably short period, often with minimal reliance on formal study. Nowadays, however, the pace of commercial life is a lot faster. Business users are hungry for information and web searches readily flag up foreign pages.

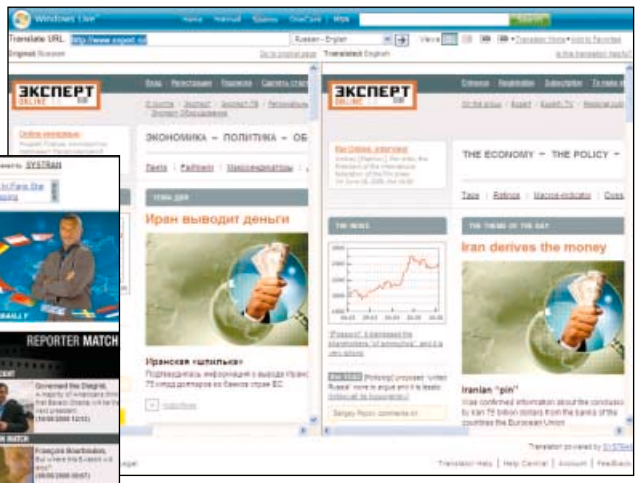
But however much of a polyglot you are, it's impossible to know enough languages to understand them all. Sometimes, these sites will have English versions that you can opt to view, but you can't depend on this. While businesses don't generally need to read (still less speak) a language fluently, there is a more or less immediate need to form judgments based on understanding the gist of what a website is saying. Site owners also have a commercial imperative to make it easy and convenient for viewers to translate their sites into their native languages.

Numerous online options provide the fast, reasonably accurate translations that users need. Usefully, many are free and we'll look at some of the best known here. However, commercial solutions have their advantages too, and we'll also touch on some of these.

Babel Fish (http://babelfish.yahoo.com)

Babel Fish has been around since the late 1990s, but was recently acquired (with Alta Vista) by Yahoo. The service is powered by a French company called Systran (see box opposite). Babel Fish will transcribe blocks of text, anything up to 150 characters, but it will also render entire web pages into a workable approximation of the original. All users have to do is enter the site address into the 'Translate a Web page' box, select the start and destination languages and click 'Translate'. The translation process takes just a few seconds, but users are likely to be left wishing more time and thought had gone into it. What you get is a sense of the overall drift of the page, which is arguably all you can reasonably expect. Site owners can also opt to add Babel Fish's translation service to their sites, by clicking the 'Add Babel Fish Translation to your site' option. This then gives you the relevant Javascript code to add to your website. You have a choice of displaying a widget for translating any text and pages or one that just translates the current pages.

In Windows Live Translator, viewing the original and translation side by side is useful



Babel Fish will communicate the sense of a page, but expect a profusion of errors

Windows Live Translator (www.windowslivetranslator.com)

Windows Live Translator has only been in existence for around a year and, at first sight, appears to be very similar to Babel Fish. As with Babel Fish, many of its translations are powered by Systran (though web pages about computer-related topics are handled by Microsoft's own technology) and you can translate text blocks (the limit is a more viable 500 characters) or a specified page. You can opt to add a web page translator to your own site, simply by pasting a code snippet into the relevant web page. However, a number of additions make Windows Live Translator far more usable than Babel Fish. For example, a link on the Windows Live Translator site allows you to elect to add a toolbar button to your browser; clicking this displays the web page

you're looking at along with its translation in up to 12 languages (when you change to a new one, the service will remember your most recent selection).

Many of the enhancements are only obvious when you've chosen to convert a page. Whereas Babel Fish simply launches the translation of the selected page, Windows Live Translator provides a handy side-by-side comparison between the original and the converted page. You also get controls that let you change the views. For example, you can transcribe text over which you hover the mouse pointer; the translation appears in what amounts to a tooltip. Conversely, in a view where the entire page has been rendered, the tooltip displays the original text. These options are convenient and make the translation experience smoother.

Google Translate (www.google.com/translate_t)

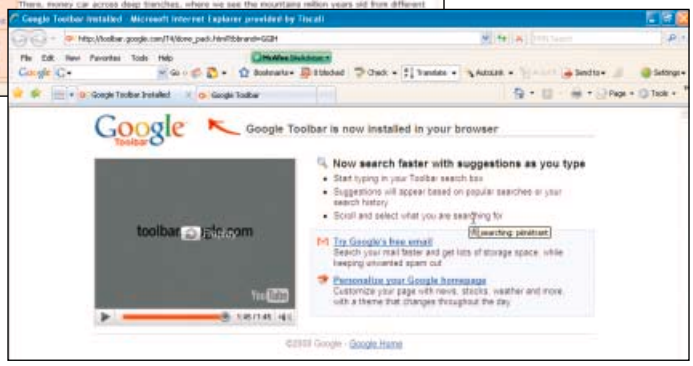
Google Translate is probably the best free translation solution. In 2006, it won a competition sponsored by the American Agency NIST (National Institute of Standards and Technology); its English-Arabic and English-Chinese conversions were particularly strong. Unlike Babel Fish and Windows Live Translator, which each support around a dozen languages, Google Translate now supports the 23 official languages of the EU and is said to produce some 1.5 million translated pages a year. Until late 2007, Google Translate used Systran as the basis for translation, but now uses its own software.

Rather than following the 'traditional' route of having linguistic experts program grammatical rules and dictionaries into computers, Google Translate uses a technique called 'statistical machine translation'. Other services also do this, but Google Translate does it better. In essence, a computer compares two documents – one in the original language and one that a human has translated. It identifies patterns and links, and uses these to create future conversions (this process is described in much more detail on **www.tinyurl.com/43kxrm**). The intention is that the sheer volume of documents fed into the process will eventually produce 'a mostly correct translation' (more on Google Translate's implementation of statistical machine translation at **www.tinyurl.com/3y7oru**).

As with Babel Fish and Windows Live Translator, Google Translate can translate specified text or entire pages. One nice innovation, though, is the ability to auto-detect the language of the text you're converting (the longer the text, the more accurate this is).

Other options are more advanced versions of the Babel Fish and Windows Live Translator equivalents. The Google Translate site is split into various tabs. Under Tools, users can right-click a language entry and opt to add this to their browser's Favourites; clicking this converts the page being viewed into that language. Users can also make it much easier for others to read their site by including the Translate gadget; this is just a question of pasting in one line of code. Perhaps the best and most original feature can be found under the Translated Search tab. Here, it's possible to enter a phrase in English and specify a destination language. Google Translate converts the text and searches for matches. Flagged links are accompanied by English versions. Clicking one produces a translation of the original foreign-language site. Moving the mouse pointer over text supplies a pop-up displaying the original text; users can also suggest a better translation.

Google Translate is better at recognising context, but still makes errors



Although in this instance Google Toolbar's translation is wrong, this is a quick way to translate single words

Google Toolbar (www.toolbar.google.com)

Downloading and installing the free Google Toolbar also supplies useful translation options, though its Translation service must be manually enabled. To do this, click on Settings in the toolbar and select Options. In the dialogue box, check Translate menu, click Translator Settings and select the destination language. Now, moving the mouse pointer over a word will produce a suggested translation. Alternatively, to convert a foreign page into English, click on Translate in the Toolbar and select Translate Page into English. Google Toolbar's Translator works with most languages supported by Google Translate, and when you're translating a page, the language will be auto-detected. **PCW**

Commercial translation options

As a test, we translated a simple phrase ('this cake is covered in nuts') into Italian and French, using the principal free services discussed here. Babel Fish and Windows Live Translator supplied 'Questa torta è coperta in dadi' and 'Ce gâteau est couvert dans des écrous' respectively. Aside from other errors, both translations use the word for 'nut' associated with 'bolt'. Only Google Translate provided a contextually accurate translation.

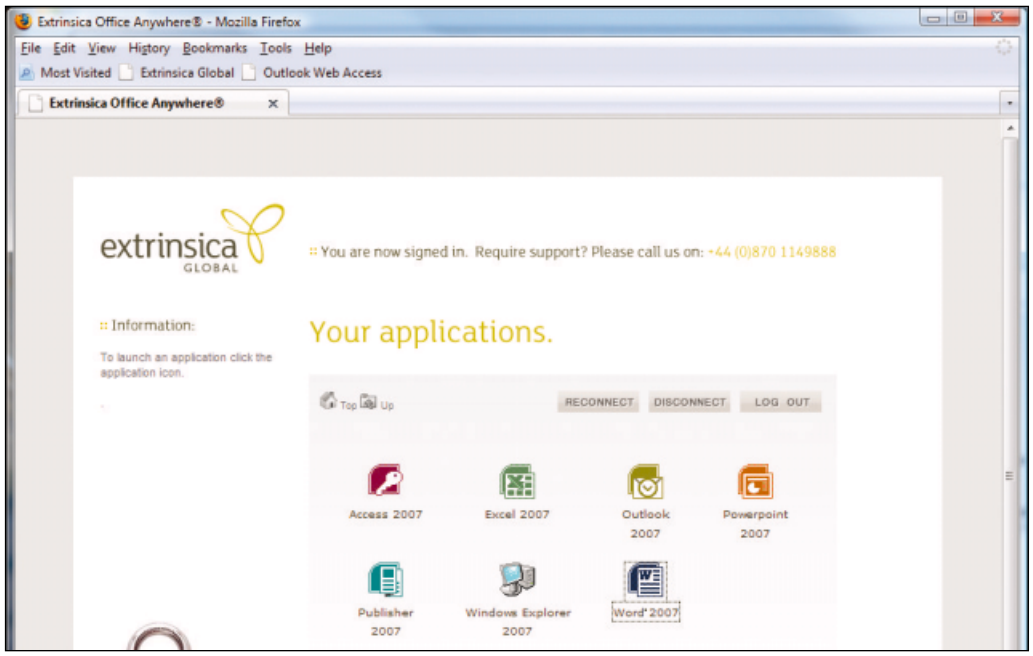
This rather simple example illustrates that translation software can only be safely relied on to provide a broad outline. This means if you need to translate mission-critical material, you'll have to look elsewhere. One option is commercial software. Systran (**www.systransoft.co.uk**) offers various applications, of which the most expensive is Systran Premium Translator at £459.99. However, since Systran powers Babel Fish and Windows Live Translator, it probably makes more sense to consider using a translation agency, which usually charge based on the word count, but vary according to language pairs, subject matter, urgency, complexity and so on. The advantage is that human translation will be far more accurate.

There is a lot of competition in this market, so shop around for the best deals – especially if you have regular translation needs. The Institute of Translation and Interpreting (**www.iti.org.uk**) provides a good source of information on business translation and maintains a searchable directory of qualified individuals and companies that could be useful.

HOSTED SOFTWARE

Extrinsica Office Anywhere

Take the office with you – wherever you go



Instead of a hosted desktop, Office Anywhere provides access to individual Office applications run on remote Windows servers

Extrinsica Office Anywhere is a little different from other hosted software services. It uses Citrix software to provide remote access to the company's managed Windows application servers, but instead of a hosted desktop, users get a menu of individual Microsoft Office applications and an Exchange mailbox and storage space.

All that's needed at the user end is a PC with an internet connection and a browser. The Office Anywhere Small Business Edition we tested provides access to the full set of Office Professional applications (Word, Excel, Access, Powerpoint and Publisher), plus 10GB of backup-protected storage shared by all the users in the company. Each user also gets an Exchange 2007 mailbox (1GB per user), which is accessible using either a hosted Outlook client or Outlook Web Access. Helpdesk support is also included in the price.

Alternatively, there's a Micro Business Edition, costing £50 per user per month, for which you get Microsoft Office Standard plus 1GB of storage and an Exchange mailbox, with access to the helpdesk on a pay-as-you-go basis.

Everything is managed for you and access is the same, regardless of the package. Connect to the Office Anywhere portal using an SSL-capable browser and you're prompted to sign on with a user name and password. If the Citrix client isn't installed, you'll be given the chance to download it with software available for both Windows and Linux. You can also buy a USB key (£70 ex Vat), which contains a virtualised copy of the client and the Firefox 3.0 browser that enables mobile users to connect without having to install any software locally – useful if the host PC is locked down for security.

You're then presented with a set of icons to start up the various applications, which appear to run on the local PC, but, in reality, are hosted on a remote application server. Any documents created will, similarly, be stored on the remote server, optimising both performance and security as backups are taken on a regular basis to protect server-side storage. You can also open and save files locally, but this can really slow things down, especially on large documents, as everything has to be copied to the server hosting the application, then copied back to be saved again.

Printing can be handled by locally attached printers or network print queues, both of which will be mapped to the hosted application when it starts.

Performance will depend primarily on the speed of your internet connection. We used ADSL broadband for most of our tests, which gave results almost indistinguishable from running the applications locally. However, the Citrix ICA protocol is optimised for low bandwidth connections and should give good results even on slower wireless links.

Font rendering wasn't quite as good as with local applications, but it was acceptable. Indeed, we found Office Anywhere to be a very workable solution, likely to appeal most to small businesses unwilling or unable to install and run in-house applications. It's also great for workers who spend a lot of their time on the road.

On the downside, authentication is limited to passwords only, you can only run Office programs and you're a bit stuck if you can't get an internet connection. However, Extrinsica is working on that one, with plans to eventually put virtualised applications on the optional USB stick to support offline working.

Alan Stevens

Verdict

Pros No need to install, license or manage local applications; Microsoft Office applications and Exchange mailbox; virtual client available on a USB stick

Cons Reliance on internet connection and availability of hosted service; single-factor authentication

Overall Does away with the need to host your own applications, but you are dependent on the internet to do the business

Features	★★★☆☆
Ease of use	★★★★☆
Value for money	★★★☆☆
Overall	★★★☆☆

From £84.60 (£72 ex Vat) per user per month

Contact Extrinsica 01869 255811 www.extrinsicaglobal.com

System requirements Internet access • Browser • Access rights to install Citrix ICA client may be required

"The cool part is that the tool clusters those results within cubes, trees or other visual designs"
Ted Kemp, CNBC

"...the battle over the search market is far from over."
Jeff James, Windows IT Pro

"...an interesting take on Web search..."
J. Nicholas Hoover , InformationWeek

"...it features some really cool 3d flip implementations...and man did it shine..."
Rob Bushway , GottaBeMobile

"...the heart of Ergo represents some exciting developments for the next stage in searching and organising documents."
Jason Whittaker , PC Advisor

ergo

Imagine the entire internet sorted by topic...

ergo - a truly revolutionary search and visualisation tool

Discover

Find information you have never even dreamed of; ergo is one step ahead of the most advanced search engines.

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Annotate

Don't lose it; ergo let's you highlight, add notes and drawings to your search results, then save, print or email.

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FSP GROUP
Power Your Life

Brave the Storm!

Blue Storm II 400/500W PSU

- Complies with Intel Core 2 Duo & AMD Athlon 64 series
- ATX 12V V2.2/ EPS 12V Rails Design
- High Efficiency up to 85%
- S-ATA Power Connectors
- Supports Multi-GPU Graphic Cards
- PCI- E Graphic Card Power Connectors
- True Total Power
- 120mm Variable-Speed Fan with Ultra-Low Noise

Retailers:

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SCAN www.scan.co.uk
MD www.microdirect.co.uk
WATT POWER SOLUTIONS www.wattpowersolutions.com
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FSPLifeStyle.com

OFFICE SECURITY

Mysecurity247 mybusiness247

See what's going on in your office wherever you are

The mybusiness247 Starter kit is an innovative solution for companies wanting round-the-clock security and surveillance

Conventional burglar alarms and surveillance systems can be costly, especially if you opt for a monitored solution, and even then you could have to deal with false alarms in the middle of the night. The mybusiness247 package, on the other hand, is relatively cheap, easy to install, and as well as 24-hour monitoring, lets you login and see what's going on from any internet-connected browser or mobile phone.

We were sent a mybusiness247 Starter kit comprising an XG1000 network system controller, plus four small Panasonic network cameras and a digital video recorder (DVR) able to record continuous video from all four cameras for up to 30 days. Manufactured by a company called Xanboo, the XG1000 is effectively a small computer that plugs into the Lan behind the internet router with the cameras and DVR (also from Xanboo), and a set of Homeplug adapters included for those without an existing network or enough free ports.

Wireless door and window sensors can also be added (£14.95 ex Vat), together with wireless motion detectors and a siren (£30.95 ex Vat each). A power controller (£34.95 ex Vat) is another optional extra that allows you to, for example, remotely power on/off lights, servers and other devices, plus there's a keypad (£25.95 ex Vat) to arm/disarm the system locally. You can also upgrade to a motorised pan/tilt/zoom camera (£177.95 ex Vat) and even add temperature and water sensors (£25.95 ex Vat each) to build your own comprehensive monitoring and surveillance system.

The extra sensors all connect wirelessly to the XG1000 and the only other hardware required is a broadband router somewhere on the Lan. There's no software to install. Instead, we simply registered for a remote monitoring account via the mybusiness247 website (£17.01 ex Vat per month), which enabled us to log into the controller remotely. The XG1000 then discovered the devices we'd installed and, via the web interface, provided us with tools to arm/disarm them, check their status, configure email and text message alerts when motion was detected and so on.

We were also able to view live motion video captured by the cameras, as well as still shots and video clips, with the data stored on secure hosted servers to prevent it being erased or tampered with. The digital video recorder, however, had to be configured and managed locally, and although simple to operate, it has very noisy fans.

Finally, using a Nokia N95, we downloaded and installed a Java applet and were able to arm/disarm devices and view live video via the mobile. The experience here will, of course, depend on the speed of your connection, although using a high-speed HSDPA link, we got acceptable and very impressive results.

Indeed, our overall impression of the mybusiness247 solution was good, although we did have a few reservations. The DVR was one – it is far too noisy. Another is the dependence on the broadband link – if there's any interruption in service, you'd lose all monitoring capabilities. We were also a little concerned about the lack of differentiation between the mybusiness247 product and a similar home security solution from the same vendor. Finally, wireless networking support would have been a welcome added feature.

Still, such reservations aside, the mybusiness247 hardware worked well in our tests and the package is worth considering if you're after a small business security and surveillance solution. *Alan Stevens*

Verdict

Pros Easy to install; can be taken with you if you move; no local software required; remote monitoring via a browser or mobile phone

Cons Dependence on broadband connection; noisy fan on digital video recorder

Overall An innovative solution for small businesses wanting round-the-clock security and remote surveillance

Features	★★★★☆
Performance	★★★☆☆
Value for money	★★★☆☆
Overall	★★★☆☆

Price £917.50 (£780.85 ex Vat) for Starter kit

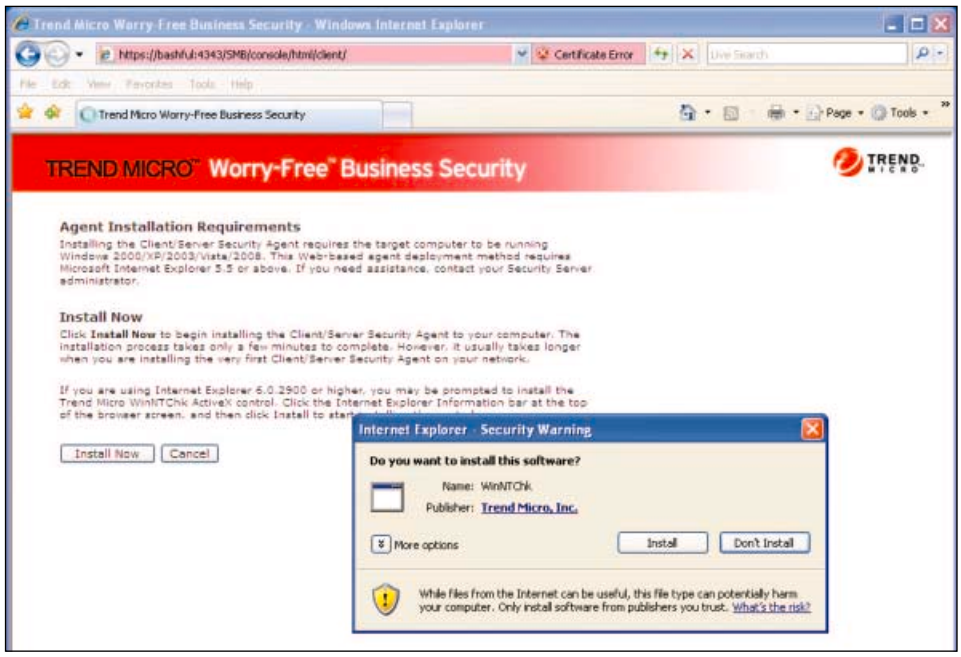
Contact Mysecurity247
0871 918 1832
www.mybusiness247.co.uk

Specifications Starter kit comprises: XG1000 controller/gateway • Xanboo digital video recorder • Four x Panasonic BL-C1 network cameras • Five x Turbo Homeplug (85Mbits/sec) adapters • Door, window, motion and other sensors also available

NETWORK SECURITY

Trend Micro Worry-Free Business Security

Take the worry out of protecting your network



Worry-Free agents can be centrally deployed or users invited to download and install the software themselves from a browser

As its name implies, Worry-Free Business Security (WFBS) from Trend Micro is designed to take the worry out of protecting a small-business network. As such, it provides tools to deal with just about everything – from viruses and spam to spyware, phishing and other threats. It's also designed to be easy to manage, although it does take time to configure and requires a modicum of expertise to get right.

WFBS is a client/server solution with a server component that must be installed before agents for use on clients and messaging servers. Installation is a two-step process, starting with the security server, which requires a Windows host, preferably dedicated to the task, although an existing Windows server, even one running Exchange, can be employed if needed.

The agent software is also written for Windows and can be used to protect servers, desktops and notebook PCs, with support for both 32-bit and 64-bit Vista systems in the latest 5.0 release. Agents can be installed manually or end users sent email invitations to browse to the security server and install the software themselves. Login script deployment is another option, together with remote installation via Active Directory or using built-in distribution tools.

Once installed, the software starts working straightaway, using default settings that should suit most small-business networks. A web-based console is used to fine-tune settings, for example, by changing the frequency with which updates are retrieved by the server and distributed to the clients. You can also distribute and manage the client settings here, with options to configure a desktop firewall, turn on real-time scanning of Pop3 email downloads and specify what type of action to take when specific threats are detected.

New in this version are browser-based utilities to warn about and block potentially malicious websites, behaviour monitoring, as well as pattern-based scanning, plus protection for Intuit Quickbooks files and folders. On notebooks the agent can be configured to apply different settings – depending on location – and there's a tool to check the authenticity of Wifi connections and encrypt data passed over wireless links.

A simple dashboard makes it easy to monitor the current threat status, which is backed up by a comprehensive set of report templates. These can be used to run reports on demand or according to a schedule, with reports emailed to specified users as either a web link or PDF.

An Advanced edition of WFBS is another option (£954 ex Vat for 25 users), offering everything in the standard package, plus protection for Microsoft Exchange and Small Business servers. Implemented via a hosted service (Interscan Messaging Hosted Security), no extra software is involved, instead messages are scanned by servers on the Internet.

As far as users are concerned, WFBS gets on with the job of protection with a minimum of fuss. Administrators will like it because it removes much of the complexity associated with other security products. We found it very straightforward to both install and manage, although extra configuration is required to take advantage of some of the more advanced options.

Finally, WFBS is Windows only and can't protect gateway devices. Trend Micro does offer other products to add this functionality, including a security appliance, but these have to be deployed and managed separately.

Alan Stevens

Verdict

Pros Comprehensive set of security tools; single agent for most options; centralised management via web-based console; hosted protection for Exchange servers (Advanced edition only)

Cons Doesn't protect gateways or non-Windows systems; additional setup work required to configure advanced options

Overall Covers most of the security bases in one easy-to-install and manage package, but some expertise is needed to take full advantage of what it has to offer

Features	★★★★☆
Ease of use	★★★☆☆
Value for money	★★★☆☆
Overall	★★★☆☆

Price £864.80 (£736 ex Vat)
25-user standard licence

Contact Trend Micro 01628 400 500 http://uk.trendmicro.com

System requirements Security server requires 512MB Ram and 1.2GB disk space, Windows 2000 SP4, XP SP2, 2003 SP1 or later • Client/Server Security Agent requires 256MB Ram (512MB or more recommended), 300MB disk space, Windows 2000 SP4 or later

POWER OVER ETHERNET

Powerdsine 7000G High Power

Deliver more power over the Lan with these new hubs

The Powerdsine 7000G family can inject up to 32W of power into Gigabit Ethernet Lan connections

Now a part of Microsemi, Power over Ethernet (PoE) pioneer Powerdsine has introduced a new range of mid-span hubs able to offer a lot more electricity over the Lan than existing products. Built to conform to the yet-to-be-ratified 802.3at (PoE Plus) standard from the IEEE, the new hubs also come with Gigabit Ethernet ports, bundled management software and a lifetime warranty.

PoE is popular with businesses of all sizes as it allows devices such as wireless access points, Voice over IP (VoIP) handsets and network cameras to draw their power over the same cables that are used to connect them to the Lan. It does away with the need for local AC adapters and enables devices to be positioned in places where power doesn't reach. It also facilitates central management of power distribution, for example, by shutting down power on specific ports out of hours.

Unfortunately the current standard (IEEE 802.3af) can only deliver around 13-15W per port, limiting what can be powered. The latest 802.11n Wifi access points, for example, need more than that to operate, as do cameras with pan/tilt/zoom (PTZ) motors. The upcoming 802.at specification addresses this by allowing 30W or more to be delivered using spare cable pairs in the network wiring, enough to drive both these devices and others such as thin clients and point of sale terminals.

Microsemi is the first to deliver a pre-standard product, with three hubs in the Powerdsine 7000G family. We tested the top-of-the-range 7024G, which has 24 Gigabit ports, while for smaller deployments there's a 12-port 7012G (£402 ex Vat) and six-port 7006G (£352 ex Vat). The same very substantial 1U rackmount chassis is used in each case with all the ports at the front together with a separate connector for attachment of a local console and a serial port for uninterruptible power supply (UPS) control.

There's no real switching intelligence inside the 7000G because it's a mid-span hub. It simply injects power into network cables with two connectors for each port, one connecting to the host switch, the other delivering the data and power mixed. A single integrated power supply delivers the electricity to the unit, which can be UPS protected if required.

Installation is very straightforward. We simply unplugged our test devices from an existing switch and plugged their cables into the powered ports on the 7000G instead. We then used short patch leads to connect the matching connector for each powered port back to the original switch. The hardest part was getting hold of suitable patch leads as they are not included.

Remote management is built in with simple web-based access to the Powerview Pro software, as well as support for Telnet and SNMP consoles.

Backwards 802.3af compatibility means that existing devices are safe to use with the 7000G hubs and we had no problems with any we tried. Pre-standard 802.3at devices aren't really available so we couldn't test any, but you can get high power splitters (Powerdsine 701, from £35 ex Vat) to work with a range of devices including those that can only accept voltages below those defined by the standards (44V with 802.3af and 50V with 802.3at). As the name implies, these split the mixed data/power lines into separate Lan and DC ports, at the same time stepping down to 24, 18 or 12V.

Alan Stevens

Verdict

Pros Delivers up to 32W per port; all ports Gigabit Ethernet capable; splitters available to power non-standard devices

Cons 802.3at standard yet to be ratified; limited to 32W per port

Overall Enables power-hungry devices to be run over the Lan, but PoE Plus standard has yet to be ratified and is still limited in terms of what it can deliver

Features	★★★☆☆
Performance	★★★☆☆
Value for money	★★★☆☆
Overall	★★★☆☆

Price £709.70 (£604 ex Vat) – 24-port 7024AG

Contact Microsemi 020 8622 3107 www.microsemi.com

Specifications 1U rackmount chassis • 24 10/100/1,000Mbits/sec Ethernet ports • Local management port • Serial port for UPS management • IEEE 802.3af and draft 802.3at compatible

NETWORK ATTACHED STORAGE

Synology DS508

Share files and a whole lot more with this neat little appliance

With five hot-swap Sata drive bays the DS508 can be configured with up to 5TB of Raid 5 protected storage

With dual network ports, five hot-swap disk bays and support for cross-platform network file sharing, the Disk Station DS508 from Synology is far from your average network attached storage (Nas) appliance. It also features built-in Raid 5 protection as well as web-based file access, USB backup and a whole host of other options normally only found on much more expensive products.

Unlike most other Nas devices the DS508 doesn't come with any disks, which does affect the price. However, disks are cheap to buy and easy enough to fit using the carriers supplied, which simply slide into the hot-swap bays at the front of the cube-like chassis. We tested the case using three 120GB Seagate Barracuda drives (available for around £50 ex Vat each), but any serial ATA (Sata) disk can be employed with the DS508 able to handle up to 5TB in total.

The interfaces are all at the back starting with a pair of Gigabit Ethernet ports for Lan attachment. Above is an eSata connector and two USB2 ports, all of which can be used to hook up external storage to take backups with support also for USB printer sharing. Cooling is handled by a pair of fans, despite which the DS508 is remarkably quiet making it suitable for use in open-plan offices.

Installation is simple. A setup program locates the DS508 then prepares the hard disks you've installed and downloads the Linux-based software used by the appliance. It's then on to a delightful web-based Ajax interface from which you next create the volumes you want to use and the level of Raid protection to apply. Multiple volumes can be defined with options to expand capacity when disks are added and upgrade the Raid level. Hot sparing, however, isn't an option and there's only one power supply.

The Synology appliance can be accessed by both Windows and Apple Macintosh users with support for Windows workgroup and Active Directory networks. Support for SMB/CIFS/NFS protocols means that Linux clients can also get in on the act, and shared files browsed and accessed from any system via a browser.

A bundled tool to take backups to the Synology Nas server is another nice feature. Plus it's possible to back up the configuration and data on the appliance either to a locally attached USB/eSata device or to another Nas appliance.

Some of the optional features are aimed more at home users than businesses, such as a built-in iTunes server and other multimedia sharing utilities. Others have clear business uses, including an integrated Apache web server complete with PHP support and MySQL database. Another is a new video surveillance facility that lets you view and record the output from network cameras via the web interface with motion detection also built-in. An FTP server is also provided, with encryption for this and HTTP users.

It took just a few minutes to get the DS508 up and running and we found it all very easy. Performance will depend on the disks and volumes configured, but even with the relatively slow 7,200rpm drives we used it gave impressive results on a par with high-end Nas servers costing much more. Factor in all the other goodies and you've a solution to rival a general-purpose server – minus the complexity. It can't run Exchange, but that's not a major issue and, that apart, it has got a lot to recommend it. *Alan Stevens*

Verdict

Pros Hot-swap Sata disks; five disk bays; Raid 0/1/5 protection; backup to external disks; Web-based access; Apache/PHP/MySQL servers; USB printer sharing

Cons Disks add to the price; no hot sparing; single power supply

Overall An impressive storage appliance with performance and capacity plus loads of built-in extras for the small business

Features	★★★★☆
Performance	★★★★☆
Value for money	★★★★☆
Overall	★★★★☆

Price £663.82 (£564.95 ex Vat) disks not included

Contact Novatech 0871 222 2812 www.novatech.co.uk

Specifications Five hot-swap Sata disk bays • 2 x 10/100/1,000Mbits/sec Ethernet ports • eSata port • 2 x USB2 ports; serial port • 800MHz processor • 512MB SDRam • maximum capacity 5TB • SMB/CIFs, AFP, FTP, NFS file sharing • 2,048 user accounts • Active Directory integration • bundled backup software

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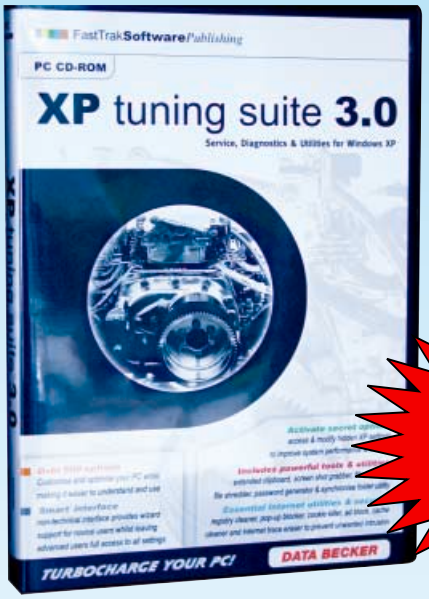

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EDITED BY NIGEL WHITFIELD

HANDS ON

NETWORKS GALORE

Networks are just about everywhere these days, and in this month's Hands On Hardware we look at how you can use them for home security, while in Performance we find out if you really will notice the difference between types of cable, and in Networks we learn about the ins and outs of setting up Windows Home Server. Speed isn't just an issue for networks, either, as we find out in Databases.

There's plenty of other useful information, too, with a look at screen-grabbing in Digital Imaging, pivot tables in Spreadsheets, the top packages for Linux and a collection of hints and tips for Windows users – including information about a curious security hole.

In Sound we have the second part in our investigation of audio effects, while Visual Programming continues to look at accessing data from Visual Basic, and in Word Processing we wrap up our look at Word's text layout options.

All this and the solutions to your problems in Question Time, so if the summer sun has failed to materialise, there's plenty to keep you occupied with Hands On.

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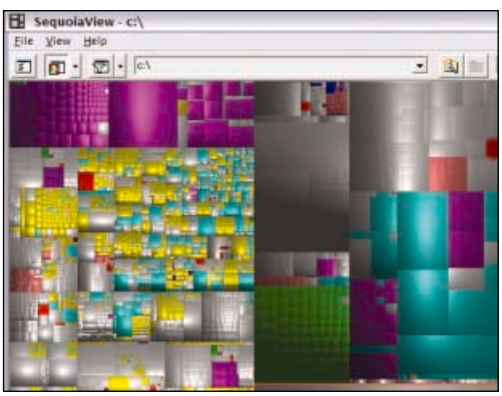

Left: See where your disk space went on page 144

Right: Use a webcam to make your home safe. See page 140

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Our experts solve your problems

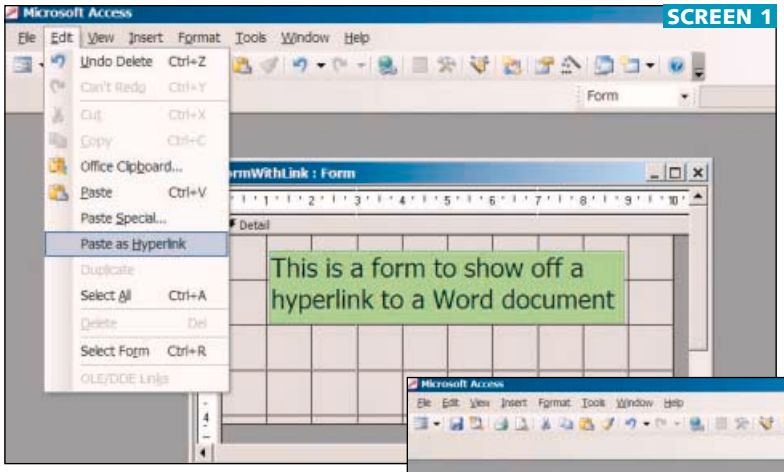
DATABASES

Q I've seen a great feature on someone else's Access 2003 form that I'd like to use in my own database application. On the form is a hyperlink to a Word document. As you'd probably guess, clicking the link opens the document in Word and the neat thing is, it places the cursor at a specific location. How do I build it?
Jim Hooper

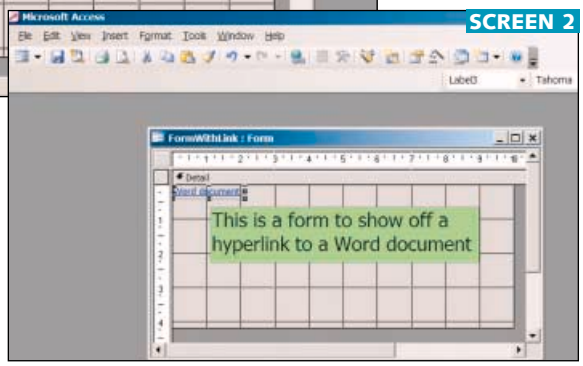
A Open the Word document to which you wish to link and highlight the word or phrase where you'd like the cursor to be placed when the document is opened. The chosen word (or words) will appear as the hyperlink on the form. Copy the text and open a form in Design view. From the Edit menu, choose Paste as Hyperlink (see screen 1) and the link is placed in the top left-hand corner of the form (see screen 2). Move it to your preferred location and save the form.

In Datasheet view, clicking the link opens a message asking if you're sure you want to continue. Click Yes if you do and Word will open the document with the cursor at the correct place.

If you have a document providing background information about the data displayed on a form, a hyperlink could be a useful addition to that form, and you can also add a hyperlink to a report in the same way.



With the required text copied, you can now Paste as Hyperlink onto the form



The hyperlink is placed top left: you can now move it to a new location

DIGITAL IMAGING

Q I bought a Canon HS100 camcorder because it is very light and the media onto which it records (SD cards) are also very light. We are planning a trip abroad and the weight allowance is ridiculously low – hence the need for something very light.

The footage is acceptable when viewed using the supplied Pixela software, or when the camcorder is plugged into a TV set using the supplied AV cable. However, when I use the Pixela Image Mixer 3 SE for SD software on the PC to save the footage as MPEG2 and play it back using Image Mixer 3, Quicktime, Real Player, Windows Movie Maker or Windows Media Player, the bottom fifth of the screen is all broken up, with what looks like part of the rest of the screen being pixellated. (The same effect happened when I changed the file suffix from .mod to .mpg).

I have been in touch with Canon's technical support team using its web-based system, but it seems to do nothing but ask questions and fob me off with obvious things such as reinstall the software, which I have done twice already with no improvement.

Do you know of anything that would carry out a successful conversion of Canon's proprietary files to something that could be manipulated using industry-standard software?
Derek Murray

A Canon doesn't produce an HS100, so we assume you mean the FS100, which writes .mod files to an SDHC card. In fact, .mod files are 'industry standard' MPEG2 video files, the file extension and directory structure of which are designed to comply with the specifications of the SDHC media.

One possible cause of your problem is that a flag that identifies 16:9 format video is not correctly set. If your video was shot in 16:9 widescreen format, this is almost certainly the issue. The utility at **www.tinyurl.com/575djr** will search your SDHC card for .mod files and copy them all to a single directory, renaming the .mod extension to .mpg and, crucially, correctly setting the 16:9 widescreen flag.

'One possible cause of your problem is a flag that identifies 16:9 format is not correctly set'

HARDWARE

Q I have a Hayes Optima 33.6 External Serial Modem (UK 5345 version). I bought it some time ago and I am reluctant to part with it because it still works

fine. I'd like to give it to someone in my family, but it was originally supplied without any software or documentation. They will be installing it on a PC running Windows 95 and need drivers for it. I checked the Hayes website, but couldn't find any. Is there anything you would suggest?
Joe O'Dell

A We couldn't find any Windows 95 drivers for a UK-specific 5345 model either, but there are alternatives that might work. If you head over to **www.hayesmicro.com/techsupport/legacy.htm**, you can find drivers for the US version of this modem. We can't guarantee it will work, but you may be in luck.

Alternatively, if you know the basic specs for your modem, you may be able to install it as a generic model – so for yours, you'd be installing a generic 33K model on the appropriate serial port. Again, this isn't guaranteed, but it's worth a s hot if the driver from another region won't play ball.

Q I'm looking to upgrade my motherboard. The current installation is an Abit KT-7 Raid motherboard, with AMD Athlon 1GHz processor, four PCI cards, three ATA hard disks and Windows 98.

I'm now looking to upgrade to an ATX board with an Intel processor that is suitable for running business applications – mainly Office 2000 and using Windows XP Pro. I need at least two PCI slots, two ATA hard disk connections, plus onboard VGA. Could you please advise me of a suitable motherboard and Intel processor I could use?
Derek Seddon

A Your first stop should be our reviews section in the magazine and on the website at **www.pcw.co.uk**.

At the time of writing, one of our highest rated Intel-based motherboards with integrated graphics was the Gigabyte GA-73PVM-S2H. This matches most of your requirements with its onboard Nvidia Geforce 7100 graphics and two PCI slots, but like most motherboards these days, there's only one IDE connector, as most hard disks are serial ATA models now.

Like all IDE connectors, this will support two drives in a Master/Slave configuration, although of course one of these will probably be your existing optical drive. For the best performance, we don't recommend that you run an optical drive and hard disk on the same channel.

Consequently, we'd recommend either buying a serial ATA hard disk, or buying a PCI hard disk controller card with spare IDE connectors – Promise is a good company for this kind of thing.

As for processors, the board will support everything from the Pentium 4 up to Core 2 Quad models, running on 800MHz to 1,333MHz buses; the latest Bios version will support the latest 45nm processors. The 2.4GHz Quad Core 6600 represents good value for its performance, but any of the cheaper Core 2 Duos will still be a significant upgrade for your system.

Memory technology has moved on considerably since your KT7 and sadly your modules won't be compatible with any modern board. The Gigabyte model recommended takes DDR2-800 memory. You may also need a new power supply, as your KT7 board used an older 20-pin power socket, whereas modern motherboards use 24-pin sockets. Some power supplies can adapt to both old and new boards, but if yours can't, you'll need a new one.

Ultimately, you may end up needing to replace a lot of components when attempting to upgrade a system that is a few years old. We'd advise pricing it all up first, as you may be better off just buying a new PC instead and keeping your old one intact as a backup.

LINUX

Q I followed the instructions in the July Linux column (see **www.pcw.co.uk/2218856**) to download Adobe's Flash plug-in in Fedora 9, but I cannot get any sound in videos, such as those on Youtube. I do get sound in other programs, though. How can I fix this?
Jon Weir

Upgrading your motherboard and processor is likely to mean new memory too

A An additional package needs to be installed for sound to work with the plug-in in Fedora 9, due to the new Pulseaudio system. The package is available from the repositories, and it is called 'libflashsupport'. You can install it from the command line with:

```
yum install libflashsupport
```

or from the Add/Remove Applications program under the System menu.

Restart Firefox and audio should be available immediately.

'You may be better off with a new PC instead of keeping your old one'

SPREADSHEETS

Q Working with Office 2003, I have been using a number of VLOOKUP formulas to import data from one worksheet into another. I must now change the numeric code and instead use three-digit alphabetical codes such as avh, aav, aah and so on.

However, I now find that the VLOOKUP formula seems to fixate on the first letter of any three-digit code so that it imports the same text whether I enter avh, aav, aah or ahv. Are you able to offer me a simple solution to this problem?
Jim Alderton

Drivers for old modems may be hard to come by, but non-UK ones may still work

A It sounds as though you are not using the optional fourth argument of VLOOKUP – range-lookup. If set to TRUE, or the fourth argument is omitted, then the function will only find an approximate match. If set to FALSE, the function will find an exact match.

Alternatively, you might like to use an INDEX(MATCH()) formula, either ↘

by writing it yourself or using the Lookup Wizard to write it for you. The arguments are,

```
INDEX(Array,MATCH↙
(lookup-value, lookup-array, ↙
match-type),column-num)
```

(Key: ↙ code string continues)

For more details, see the description of these functions in the Excel Help file.

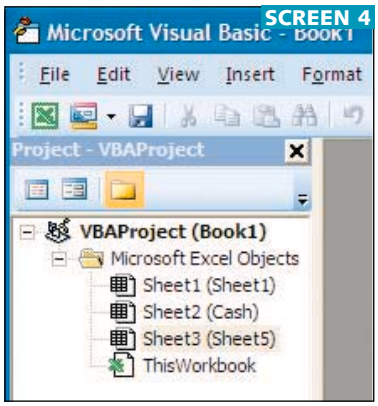
Q I have had a problem creating graphs that use weeks as the timeline in Excel. Supposing I want to graph the number of hours booked to a particular job each week, I have a table that has the week beginning date, followed by the hours booked.

The bars on the resulting graph only take up one-seventh of the normal width. This appears to be because Excel only recognises days, months and years as valid time periods. But other than using text for the dates, is there a way I can get full-width bars with weeks as the timeline?

Mark Forbes

A You might prefer to use a Gantt chart (see screen 3), named after the American project management expert Henry L Gantt. If the week beginning dates for the first month are in column A and the hours booked to a particular job are in column B, give columns to the right of this the column width 2.

In cell D2 enter `=B2`. In E2 enter `D2-1` and drag along the row. Drag this range down to D5:W5. Format the range D2:W5 with a white font on white background. Conditional format cell D2 with the rule, Cell Value is between =1 and =”B2”. In the example, the Conditional format is for a blue font and blue fill with a white underline. Use the Format Painter tool to copy this Conditional format throughout the range. Excel will change the references appropriately.



SCREEN 4

Each sheet has two names – a Codename and the name you gave the file

Q If I change the name of an Excel worksheet on its tab, I currently also have to change any reference to that sheet in my macros. Is there any way around this problem?

Clare Linley

A Fortunately there is. VBA for Excel gives every worksheet a Codename. You might add, remove or move sheets, or change their names, but a worksheet’s Codename remains the same. To see what the Codenames of the sheets in a workbook are, open the VBA editor using Alt & F11. Display the Project Window (see screen 4). You’ll see every sheet has two names.

The name in parenthesis is what you have named the sheet. The Codename is the one outside the parenthesis. So instead of using a line of code in your macro like:

```
Sheets(“Cash”).Select
```

you should use a description like

```
Sheet2.Select
```

Q Is there a way of selecting all the cells on an Excel worksheet that contain Comments?

John Hickle

A One way is to use the keyboard shortcut Ctrl & Shift & O. The focus shifts to the first comment on the sheet, then every time you press the Enter key, it shifts to the next one.

To read the Comment, right-click on the cell and choose, Show/Hide Comments. In Excel 2007, you can click the Next button in the Comments group under the Review tab to jump from the first comment to each succeeding one. You can also instantly display the contents of every comment on a worksheet by clicking the adjacent Show All Comments button. You can then print all the Comments as they appear on the worksheet or at the end.

‘Keep your sensitive files in a non-indexed location’

WINDOWS

Q Using XP and Word 2003, I needed to eliminate certain information from the computer. I deleted the files, emptied the Recycle Bin and purchased Secure Delete to complete the exercise.

I was later appalled to find all the sensitive information still complete, and available in full, in Google Indexing. Only by uninstalling Google Indexing was I able to achieve what I wanted.

Now I have a new machine with Vista Business, which has its own indexing. I have completely failed in my search of Microsoft’s website and the internet to find out how to uninstall Windows Vista Indexing.

Can you help me please?

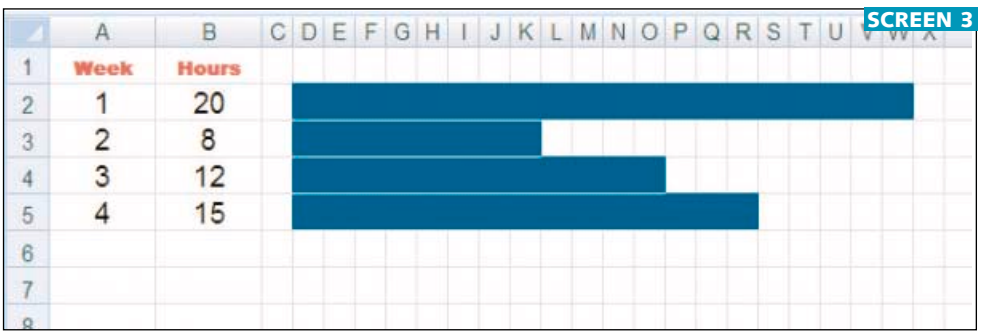
Vince Emmerson

A You have two alternatives. First, you can stop the Search Indexing service completely. To do this, type Services in the Start, Start Search box. In the list that appears, scroll down to Windows Search, right-click on it and choose Properties. Click the Stop button and set the Startup type to Disabled (see screen 5).

A better alternative is to keep your sensitive files in a non-indexed location. If you go to Control Panel, Indexing Options, then click the Modify button, you’ll get a list of locations – you can expand these to show sub-folders then tick or untick individual folders.

To make a clean job of the process, go back to the main Indexing Options dialogue box, and then click on Advanced and Rebuild.

Show all the hours worked in a Gantt chart



SCREEN 3

WORD PROCESSING

Q I have a fairly long Word 2003 document and I'd like to change the style of all the headings and sub-headings.

I know how to create a new style, but that means going through every single heading and sub-heading, and then changing its style. Could I automate this with a macro?

Dave Shipley

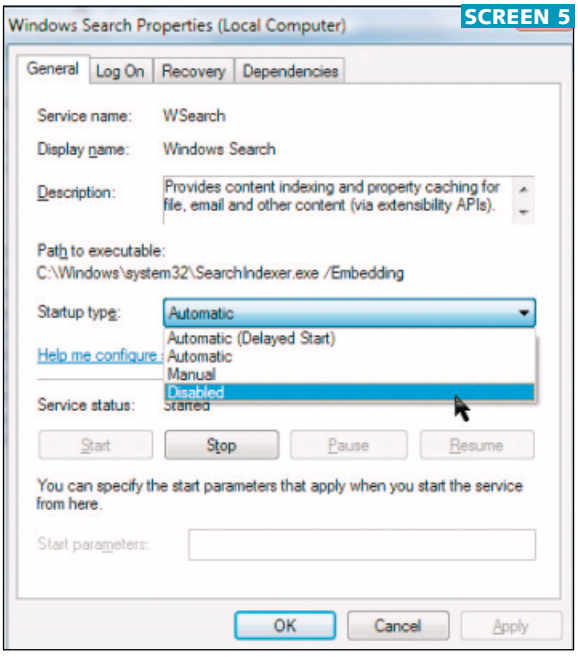
A You could, but there are better ways to do this. The first is to use Search and Replace – with the focus in the 'Find what:' box, don't type anything, but click the More button, then the Format button, then Style. Scroll down to the style you want replaced and click OK. Repeat the process in the 'Replace with:' box and select the style you want to replace it with – OK out of the style list, then 'Replace All'.

An even easier way is to open the Styles and Formatting task pane and right-click on the style you want changed and choose Modify. In the dialogue box that appears, click the Format button and make the changes you want from the various dialogue boxes offered by the sub-menu.

Back in the Modify Style box, click OK and all instances of that style in the document will be updated. If you want all future documents based on the current template to use the modified styles, tick 'Add to template' box before closing the dialogue.

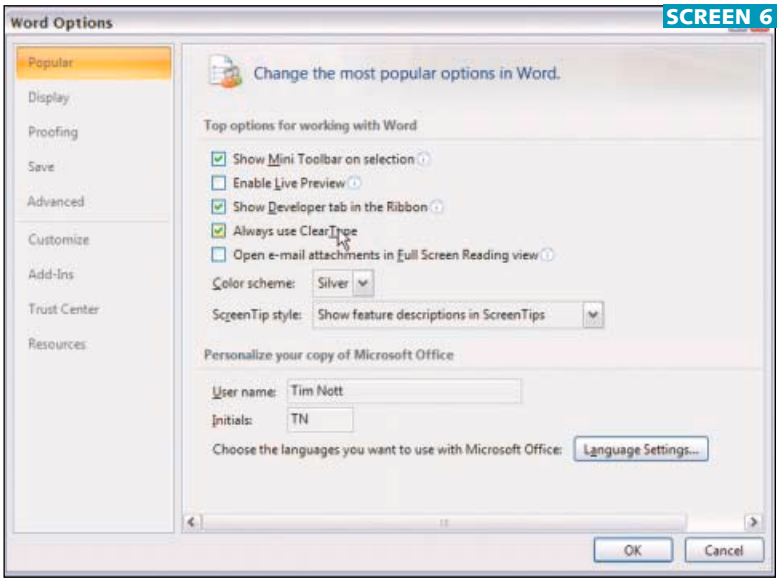
Disable Windows indexing to ensure sensitive files can't be found

SCREEN 5



Clearing the Cleartype option may make no difference

SCREEN 6



Q What is the 'Always Use Cleartype' checkbox for in Word 2007 options? It doesn't seem to make any difference on my Windows XP system, even after restarting Word, as requested by the message box.

Bryan Fitzgerald

A Cleartype is a font-smoothing technology that has been primarily designed for LCD screens. The new fonts supplied with Office 2007 are optimised for use with Cleartype. Having experimented, we too found that the setting you mentioned made no difference – Cleartype stayed on (see screen 6).

However, if you disable Cleartype globally in Windows Display Properties, the 'Always use…' option in Word will override this and you'll still get Cleartype in Word.

Q I'm trying to replace the double quotes in a Word document with the French-style double chevron. I can type the latter into text or into the 'Replace with' box with the key combination Ctrl &, followed by the < or > keys. However, although Word states that so many replacements have been made, nothing changes in the document.

Is this not possible or am I doing something wrong?

Carole Lavergne

A We tried the same exercise, and got the same result as you, so you are not doing anything wrong. After some experimentation, though, we found that the culprit was the Autoformat As You Type setting for replacing straight quotes with smart quotes. Turning this option off before performing the search and replace operation cured the problem.

Q I have a strange problem when using the Web toolbar in Word. Sometimes the Formatting and Standard toolbars disappear, and I have to go to View, Toolbars to reinstate them.

Is this a problem with Normal.dot or some other Word setting?

Graham Cole

A We're not sure why, but the Web toolbar has a button that hides all other toolbars, and you may be clicking on this. It's the one with the up or down arrow – clicking on it a second time will restore the toolbars. **PCW**

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Gordon Laing has been a hardware enthusiast since his first Sinclair ZX80 and as a former editor of PCW and contributor for over 10 years, what he doesn't know about technology isn't worth knowing.

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Safe as houses

How to build a monitoring system using your existing PC setup

In this month's Hardware column, we're taking a look at security monitoring from a PC perspective and revisiting the subject of file synchronisation as an alternative to dedicated backup software.

Starting with monitoring, there's a vast array of options available for anyone who wants to keep an eye on things, whether it's listening out for a baby crying in the nursery, checking on a pet, seeing if the kids or babysitters are having a party in your absence, or whether your home and possessions are secure while you're at work or on holiday. Some are standalone systems, while others are designed to work alongside your PC or existing networking infrastructure.

As always, it takes a real application for you to start thinking seriously about the options, and for me that process started with a desire to audibly monitor our newborn baby from another room. However, I quickly came to realise certain solutions could have a detrimental impact on my existing equipment, while others could offer considerable flexibility in the future for other applications. So while my own journey started with proprietary baby equipment, it ended with flexible monitoring solutions that worked with, rather than against, my PC equipment. As such, this column is for anyone looking into monitoring, whether they're a new parent or not.

Audio monitors

The most common monitors for babies simply involve two boxes: one that listens to the baby and the other that relays the sound to the parent. Some baby monitors communicate over power lines, but most are wireless, allowing for flexibility in placement.

What could be simpler? Well, call it bad luck, but I tried three audio

You can use webcams for basic audio and video monitoring work, as long as you have a PC nearby to connect it to and another to 'listen in' with

monitors and found none of them offered what I'd describe as acceptable quality. Two were analogue wireless systems that transmitted more noise than signal and managed to bring my existing Wifi system to its knees – and believe me, I tried multiple channel combinations on both the monitor and the Wifi.

My third unit shunned wireless for communication over mains power lines. Almost unbelievably, this one made the first two sound good in comparison. There were no drills, hairdryers or any other electrically 'noisy' devices running, but again all I heard was noise – this time without any perceptible signal at all.

Some recent pricier wireless models use the same Dect technology as digital cordless phones to avoid interference, but that got me thinking: why bring additional and potentially conflicting technology into the home, when most PC enthusiasts already have everything they need?

I decided that working with my existing network, rather than against it, was the way forward, and being Hands On Hardware, I went one step further to see if I could create a satisfactory monitoring solution using only my existing PC setup with no extra cost or even downloads.

Webcam monitoring

If you want to use your existing PC equipment for monitoring over Ethernet, the simplest configuration involves two computers: one listening and the other relaying the signal. The former will need a microphone, although a webcam will work just fine while also offering the possibility of video monitoring.

It won't surprise you to learn that I already had a PC in the baby's room, as well as a Media Center PC in the lounge. There was also a webcam in the baby room for video calls with the family, and the Media Center PC was, of course, connected to speakers. So my first test simply involved making an IP phone call from one to the other using existing messaging software.

This worked surprisingly well in practice. The webcam picked up even quiet sounds and the Media Center PC mixed the sound from the phone software with that of the TV or music – no interference, no cracking or hiss, it just worked and didn't involve any new equipment. Video was also possible, although the standard webcam wasn't very sensitive in low light.

A dedicated IP camera such as the Panasonic BL-C131 can connect straight to a wired or wireless network and begin broadcasting or uploading images

Refining the system

There are, of course, limitations with this setup. First, it relies on having two PCs switched on all the time, although my Media Center PC would be on during the evenings anyway. Second, there's a reliance on messaging

That syncing feeling

In August's Hardware column, I described how file synchronisation software may deliver a superior backup solution for many people than dedicated backup software. The main benefit is having instant access to all your files in their original format, rather than a single proprietary backup file, together with the ability to target specific folders, rather than having backup software search for relevant files itself.

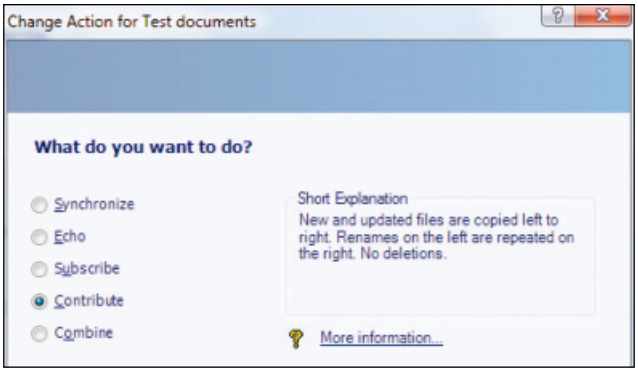
File syncing software also has the ability to reflect any changes made to the original files, so if you edit or delete a file, this is matched on the synced version. In file synchronisation terms, this is known as an 'Echo' mode and prompted several emails to the Hardware inbox.

Reader Simon Warren agreed that the manual syncing of specific data was indeed more reassuring than the automatic searching of many backup programs, but he noted Echo may not be the safest approach. He said: "It provides no protection at all against colleagues, children or even 'senior moments' where files are deleted or altered against your wishes. On several occasions, I have been very glad that I was able to restore an older version of a file from a backup disk."

This is a very good point. My personal requirement was to keep an exact copy of my original files in a secondary location, including any changes and deletions – in this instance, Echo was the right mode to synchronise with. But if you want protection against accidental deletions or alterations, then a different approach is required.

Most file synchronisation tools offer a choice of modes, including the ability to keep a copy of files on the right side, which are deleted on the original left side; in file syncing terms, this is known as 'Contribute'. Indeed, reader Geoff Wells wrote to advise: "Contribute is surely more appropriate [than Echo] as new and amended files are copied left to right, but there are no deletions". Geoff uses Robocopy, a free utility that comes as part of the Windows Server 2003 Resource Kit Tools; search for Robocopy at **www.microsoft.com**.

Jim Littler is another advocate of Contribute mode, this time using Microsoft's Synctoy, while Brett Laniosh recommended Karen's Replicator. The interesting thing is just how many people are regularly using syncing software to perform backups.



File Synchronisation software, such as Microsoft's free Synctoy, can provide a compelling alternative to dedicated backup software. But beware: in Echo mode, any accidental file deletions will be reflected on the copy. To keep a copy of deleted files, use the Contribute mode instead

The Super Flexible File Synchroniser program tested in August's edition also offers options to keep files that have been deleted or altered, although it doesn't refer to the process as Contribute. See **www.superflexible.com** for more details. Options like Contribute may offer protection against files that have been deleted on the left side, but you'll end up with a bigger collection of files on the right that may no longer be required. If you're also keeping copies of files with each alteration, you could end up with many revisions of the same file.

There's more than one way to make a backup, so as always, think about what it is you'd like to achieve and choose the software and modes that will deliver it in practice. Once again, we'd like to hear from anyone with a backup solution that works well for their needs.

software, which could become unavailable for some reason.

One way to eliminate the messaging software and potential internet issues is to use alternative software to broadcast the webcam's signal across your private network instead. You'd then monitor the signal from a web browser on the PC in your lounge. There are plenty of webcam surveillance programs available that will do this, such as Digi-Watcher from **www.digi-watcher.com**.

If you'd also like to eliminate the PC from the baby's room, you could swap it and the webcam for a standalone IP camera. These connect directly to an Ethernet network (some are wireless), and broadcast what they see and hear to an IP address, so you can monitor it using a web browser.

The Y-Cam Knight is a dedicated IP camera that can connect to wired or wireless networks. It also features 30 infra-red LEDs to illuminate rooms or exteriors in complete darkness

You can keep this IP address private for use on your network only, or let it to be accessed externally via the internet, which will allow you to monitor your home from anywhere in the world. This setup can be very appealing, because what you use as a baby monitor while you're at home could become a home security device while you're away.

Modern IP cameras not only broadcast using HTTP to a web browser for 'live' monitoring, but also often provide FTP or email facilities for sending periodic images to an off-site location, so even if a burglar nicks your camera, you'll still hopefully have an image of him doing it.

Typical models that have both wired and wireless connectivity include Panasonic's BL-C131CE and the Y-Cam Knight IP camera. The Panasonic has a pan-and-tilt camera, while the Y-Cam Knight features 30 infra-red LEDs that operate in complete darkness; both cameras cost around £140.

A simpler way?

The one thing all these solutions have in common is the requirement of a fairly sophisticated device to receive the signals, such as a PC, laptop or smartphone. This wasn't an issue for me, though, as I already had my Media Center PC present and running pretty much all the time in my living area, and I rarely travel anywhere without a laptop.

However, if this still smacks of technology for technology's sake, there are much simpler solutions that can still avoid interference. If all you want is to see and hear your baby from another room without any interference, consider one of the low-price security cameras from electronics stores that, for about £20, will get you something that looks like a webcam with a long audio and composite video cable you simply connect to a TV set.

If you're using your PC for monitoring, we'd love to hear any tips about how you're getting on. **PCW**

Gordon Laing has been a hardware enthusiast since his first Sinclair ZX80 and as a former editor of PCW and contributor for over 10 years, what he doesn't know about technology isn't worth knowing.

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Speed up with able cable

The quality of your cabling can make a difference to network speeds

A recent house move meant I had to lay some fresh network cable, so I took the opportunity to upgrade. I'd previously been mostly using enhanced Category 5 cable, or Cat 5e, although when packing my equipment, I was embarrassed to find older non-enhanced Cat 5 patch cables still in operation – not for critical links, I should add.

Cat 5e improved on old Cat 5 with stricter specifications and reduced crosstalk, although both types share the same 100MHz signal attenuation. Cat 6, which has stricter specifications, improved crosstalk and reducing signal noise. This, and an improved connector, allows Cat 6 to support a signal attenuation of 250MHz. It is fully compatible with existing networking equipment, but if you mix and match cabling between devices, they'll communicate at the lowest common denominator.

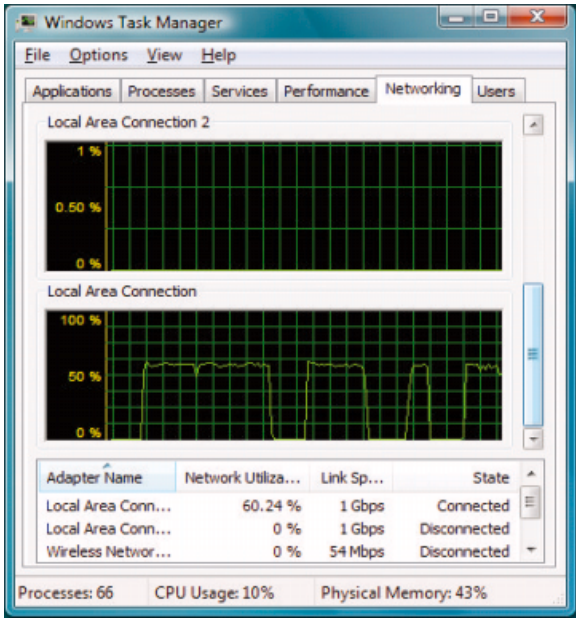
Cat 6 was becoming available when I bought my Cat 5e cabling, but at a high premium. Today, although prices of Cat 6 are affordable, the big question is what sort of benefit you're likely to enjoy in practice over Cat 5e, and even Cat 5. After all, while Cat 5e and especially Cat 6 are widely recommended for Gigabit networking, the standard was originally designed to work also with ageing Cat 5.

Gigabit tests

To test the different cabling standards, I connected two PCs equipped with onboard Gigabit adapters to a Netgear GS108 Gigabit switch. Gigabit network adapters have become standard on modern motherboards, but to exploit their full speed, you must connect them to a switch or hub that also supports Gigabit speeds; most hubs and switches still use the slower 100Mbit standard.

One PC was connected to the switch using a 10m length of Cat 6 cable, while the other PC was connected with a series of different 1m patch cables: first an old Cat 5 cable, followed by Cat 5e, and then Cat 6. The first PC was equipped with a striped Raid array to ensure data throughputs wouldn't be a problem.

I then copied a variety of files from the first PC to the second and timed how long it took before shutting down, changing the cables, powering up and repeating the test. The first set of files consisted of a 925MB folder containing 168 digital photos. The second set was a single Media Center TV recording measuring 1,208MB.



Windows Task Manager can reveal your network utilisation. Here it's showing that the transfer of a large video file over a Gigabit network is consuming around 60 per cent of the resources. In our tests, this corresponded to a speed of 261Mbits/sec

The quickest Cat

With the second PC connected to the switch using an ageing length of Cat 5 cable, the folder of photos took 41 seconds to copy; this corresponded to an average rate of 22.6Mbytes/sec. Next, the single video file, which copied across in 39 seconds, corresponded to a faster rate of 31Mbytes/sec. In networking terms, speeds are normally quoted in bits rather than bytes, so multiplying these figures by eight gives rates of 181 and 248Mbits/sec respectively.

Next I switched the Cat 5 cable for a Cat 5e, which shaved only a second off the photo folder, while the video file took the same time. So the Cat 5e cable offered rates of 185 and 248Mbits/sec for the photo and video transfers respectively.

Finally, I swapped the Cat 5e cable for a new Cat 6 one. This time the photo folder transferred at exactly the same speed as the Cat 5e cable, although the video file copied across two seconds faster. So, the Cat 6 cable offered rates of 185Mbits/sec and 261Mbits/sec for the photo and video transfers respectively.

Cat 6 or Cat 5e?

In my tests, Cat 6 cabling didn't offer a significant increase in performance over Cat 5e or Cat 5, so I wouldn't worry too much about upgrading existing cabling.

If you're buying new network cables, though, I wouldn't skimp with older Cat 5e, as Cat 6 will give your network more room to breathe should you upgrade to 10 Gigabit in future.

If you're after significantly better networking performance, make sure you are getting the best from your adapters. Most PCs and motherboards these days have Gigabit adapters, so don't throttle them with a 100Mbit hub. Buy a Gigabit switch: doing so saw my network speeds leap from an average of 40Mbits/sec to around 200Mbits/sec; indeed the 261Mbits/sec measured this month is my best yet, and a respectable result for a Gigabit network after overheads have been taken into consideration.

Beyond this, ensure your adapters are running their latest drivers and see if you can enable Jumbo packets or frames on each; if you can, you may see a further boost for larger files.

Ultimately, if you transfer lots of files between local PCs, it's worth ensuring your network is running optimally. I'd be interested to hear your reports, especially if you've achieved particularly high speeds on your Gigabit network. **PCW**

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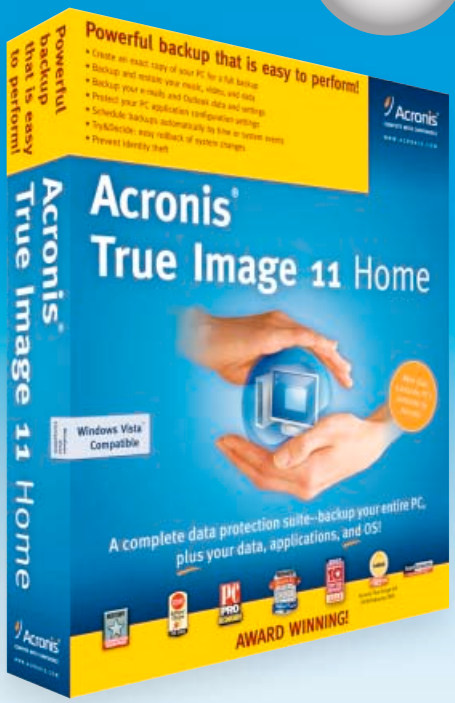

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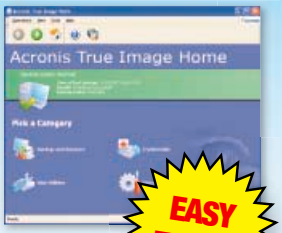

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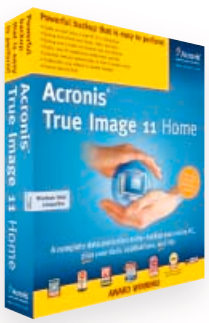

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(CODE PC13)

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Visual clues and breadcrumbs

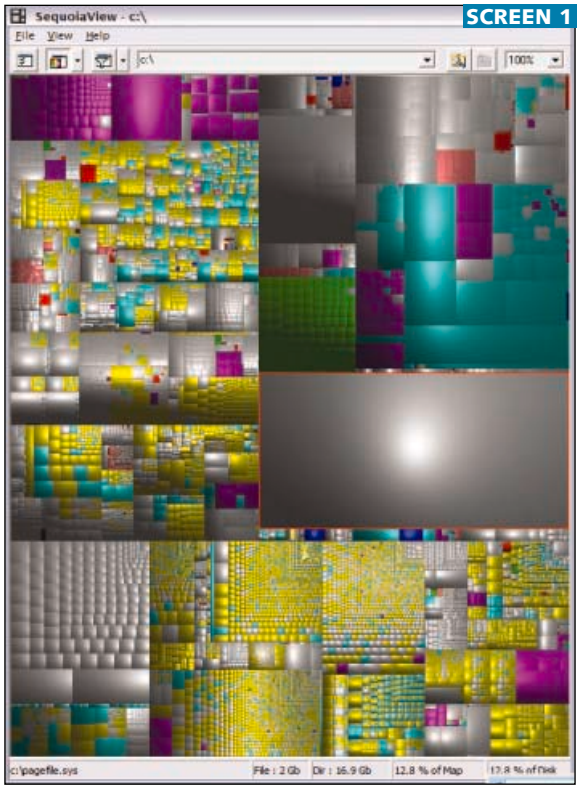
Disk space in pictures, a trail of breadcrumbs, a screensaver mystery solved, and more

Where's my disk space gone? Who among us has not asked themselves this question? I know I have ever since my Windows 3.0 folder – sorry directory – reached 30MB. Although you can right-click on a folder (or on a selection of folders) and click Properties to get the size, it's a fiddly business. What you really need is something to give a visual overview of a drive or folder and Sequoiaview, developed at the Eindhoven University of Technology, does just that. Point it at a drive or folder and it will show each file as a 'cushioned rectangle', grouped into larger rectangles representing folders. You can then see at a glance where the big eaters are, and pass your mouse over them to get the file names. That great big lump halfway down on the right in screen 1 is the 2GB Windows pagefile.

WinDirStat is even better. It's published under the GNU General Public License, so you are encouraged to share and even change the program. It also comes in eight languages. WinDirStat has a split view, with a list of folders above a cushioned rectangle view. Clicking on an item in either view highlights it in the other, and there's an on-screen guide to the colour codes (see screen 2). Both programs are freeware and you'll find them at **www.win.tue.nl/sequoiaview** and **www.windirstat.info** respectively.

Crumbs

One of the things I've come to like about Windows Vista is the so-called 'breadcrumb trail' in Explorer. This is a toolbar that shows the path to the current folder, but is interactive – click on a parent or other ancestor and you'll go to that folder. Click on the arrow to the right of the ancestor to see a list of sub-folders at that level. You can also toggle between this and the conventional backslash-separated path should you want to copy the latter. Thanks to the people at Minimalist Explorer Breadcrumbs, XP users can also experience these delights with the Explorer Breadcrumbs toolbar.



See where the space went with Sequioa…

…and a two-paned view in WinDirStat

Download it from **www.minimalist.com/software/ExplorerBreadcrumbs**, install it and you'll find it added to the list of available toolbars in Explorer's View menu (see screen 3). It's available free of charge, but Minimalist would appreciate you registering it for $7.95, which is well worth it, in my opinion.

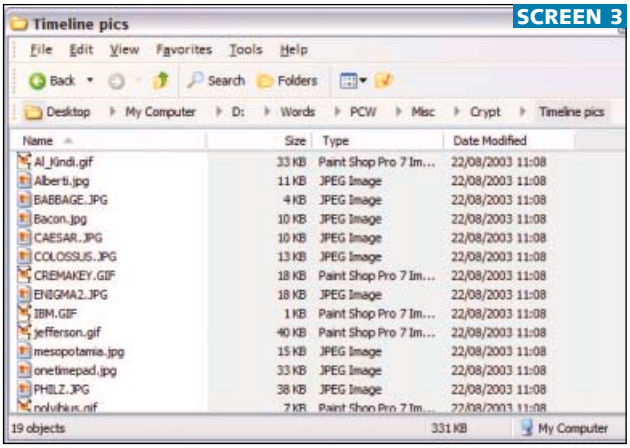
Welcome, stranger

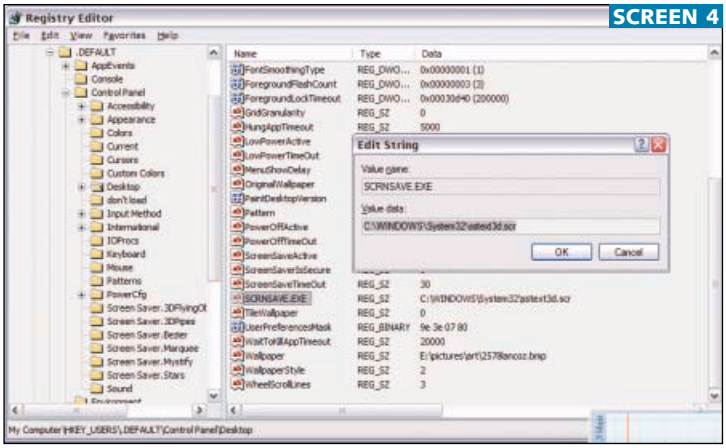
Now here's a funny thing. I have my XP screensaver set to display a slideshow of my pictures. But returning to my PC one day, I noticed the XP logo screensaver was running. The mystery was solved when I pressed a key and found myself at the Welcome screen. The last user had logged off. XP retains a different screensaver for the Welcome screen, and there is no user-interface method of configuring it. But it can be changed from the Registry.

So having made a System Restore, this is what you do: Start, Run, Regedit and navigate to HKEY_USERS \.DEFAULT\Control Panel\Desktop. In the right-hand pane, double-click on the string value named SCREENSAVER.EXE. Change its value to the name of another saver (see screen 4). You'll find all the XP savers in the Windows\System32 folder with the .scr extension – see figure 1. If you want to change the interval before the screensaver kicks in, edit the ScreenSaverTimeOut value – the default is 600 seconds.

You can also avoid the brief view of the Bliss wallpaper you get on logging on or booting the PC by double-clicking the Wallpaper string value and changing it to point at another .bmp file – you'll need to enter the full path to the file.

Setting the screensaver options (should there be any) is rather more complicated. What I did was switch to the desired screensaver, temporarily, in my own account and copy the relevant





Registry settings across to the HKEY_USERS\.DEFAULT account. These can take some finding, but by using the 3D text saver, I set the text to 'Nobody is logged on' and used the Regedit Search tool to find this at HKEY_CURRENT_USER\Software\Microsoft\ScreenSavers\Text3D. I then copied the relevant entries to a corresponding key under HKEY_USERS\.DEFAULT. The easiest way to do this is to export the HKCU key to a REG file, then edit it in Notepad to replace HKEY_CURRENT_USER with HKEY_USERS\.DEFAULT, then save and merge the file back into the Registry. And yes, I made a Restore Point first.

Above left: Breadcrumb trails for XP users

Above right: Changing the Welcome Screen screensaver

The dark side

Although this might seem like harmless fun, there's a rather more sinister aspect. Screensavers are really executable files and you can assign other executables to the SCREENSAVER.EXE value. I tried this with Explorer.exe and was rather taken aback to find that this gave me access to Windows as SYSTEM without logging in and with full administrator status (see screen 5). This makes a mockery of XP's security – by the way, it was XP Pro with SP3.

Vista is far more secure, so I fired up Vista Ultimate and tried the same trick. Changing the screensaver was difficult, as without DirectX only the Logon.scr would work. Trying the Explorer.exe trick met with failure – the Welcome screen would black out for a few seconds, then return. But setting Cmd.exe as the screensaver was a riotous success on my part and something of an abject failure on Vista's. I was able to browse the file system and run applications such as Notepad, Microsoft Paint, Word 2007 and Regedit. However, I couldn't save files, delete system files, open or take ownership of private folders, and although I could load the User Account controls, I couldn't create a new account or change an existing one. But I could copy files, open others and I'm sure I could do a bit of damage. And having installed Vista Service Pack 1, this door is still wide open.

So, what can you do? Well, the old advice that most of us ignore is to not use an Administrator account for normal use. Limited and Guest accounts can't change the relevant section of the Registry. All accounts with administrator status should be protected with a strong password.

No password, no account, but full access

Safely remove

Here's a neat XP trick sent in by reader Eric Harding, which also works in Vista. If you want to promote the 'Safely Remove Hardware' icon from the notification area to the Desktop, right-click on the Desktop and choose New, Shortcut. In the 'Location of the item' box, type

```
%windir%\system32\Rundll32. ↙
exeshell32.dll,Control_RunDLL ↙
Hotplug.dll
```

(Key: ↙ code string continues)

and in the next dialogue box give it a suitable name. Finish the shortcut wizard, then right-click on your new shortcut and choose Properties. Click the Change Icon button on the shortcut tab, and browse to Hotplug.dll to find the correct icon.

Test your new shortcut – it should bring up exactly the same dialogue box as the one in the Notification Area, and if all is well, you can safely remove the latter. Right-click on the Start button, Properties, then the Taskbar tab (or in Vista, the Notification Area tab). Tick the 'Hide inactive icons' box, then click on Customise. You'll see that each item can be set to one of three states – Always show, Always hide or Hide when inactive. Set the Safely Remove Hardware icon to be always hidden.

Did you know?

You can browse Windows XP Explorer without touching the mouse. In folder view, the Tab key shifts the focus between the folder tree, files, address bar and button to hide the folder pane. With the focus in the folder tree, the up and down arrows step through the folders, and the left and right arrows expand and contract subfolder branches. With the Control Key held down, the arrows scroll the display in the pane. In the files pane, the up and down arrows step through the files, and Control & Up or Down scrolls vertically. The Left and Right arrows perform slightly differently. Enter opens the selected file. **PCW**

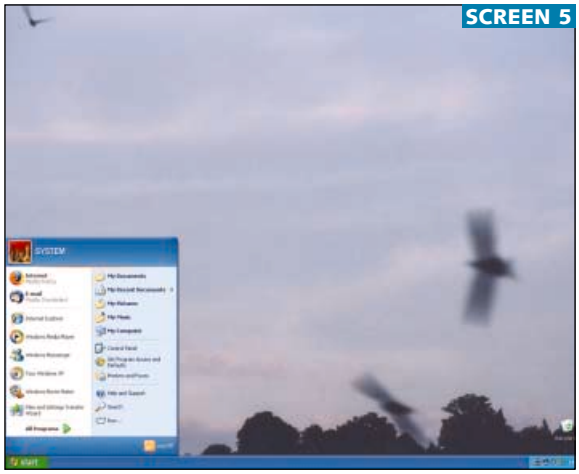


FIG 1

Standard XP screensavers

logon.scr	XP Logo
scrnsave.scr	Blank
ss3dfo.scr	3D Flying Objects
ssbezier.scr	Beziers
ssflwbox.scr	3D Flowerbox
ssmarque.scr	Marquee
ssmypics.scr	My Pictures Slideshow
ssmyst.scr	Mystify
sspipes.scr	3D Pipes
ssstars.scr	Starfield
sstext3d.scr	3D Text

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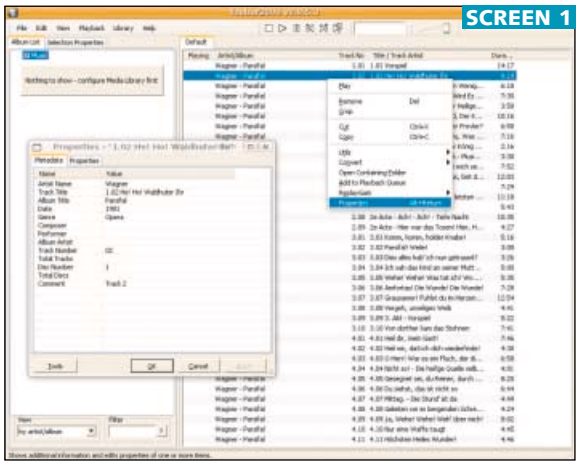
Essential extras

Get more out of your new Linux installation with these packages

Last month we looked at the recent releases of two popular Linux distributions, Fedora 9 and Ubuntu 8.04 LTS. Overall, the conclusion was that Ubuntu was better suited to the average user, while Fedora offered some cutting-edge technology for the more experimental. This month we'll look at a couple of additional pieces of software you might want to install onto a fresh installation of either. This is assuming that you have installed all the updates and, for Ubuntu the recommended Ubuntu Restricted Extras (found in the Add/Remove Applications program).

A 15-year vintage

Along with the spring and early summer releases of the main Linux distributions, another important release was Wine 1.0 (see screen 1). It has taken 15 years of development to reach this first milestone release, since the project was started back in 1993 by Bob Amstadt to get Windows 3.1 programs to run under Linux. Since then it has grown to support applications developed for all versions of Windows, and has been ported to several other platforms (it is even possible to run under Windows itself).



Wine 1.0 running the Windows foobar2000 application natively under Ubuntu Linux

Linux and the graphical desktop it is running. The major benefit of this method is that no version of Windows is required to run the applications.

All the code to perform the translation is part of Wine, which is fully open source and contains no Microsoft code. A drawback, and it is a major one, is that a reverse-engineered product such as this is far from perfect – while many applications run perfect or nearly so, some don't run at all. Also, since the binary is run directly on the CPU without any emulation, only Intel-compatible processors are supported.

> 'Wine has grown to support applications developed for all versions of Windows'

If you are confused as to what Wine is, it's really quite simple. When a Windows executable normally runs, much of the code involves making calls to the Windows operating system in order to perform various tasks. Wine creates a translation layer between Linux and the Windows executable; in other words, these operating system calls are translated on the fly into equivalent calls on

With the lead-up to Wine 1.0 came a feature freeze, where only bug fixes were accepted. This led to a large number of long-outstanding bugs being resolved, and many minor issues with applications fixed. The Wine website (**www.winehq.org**) has a subsidiary site devoted to information about compatibility with applications and games at **http://appdb.winehq.org**. Some programs are listed under the 'Platinum' category, which means they run flawlessly under Wine on a standard plain installation. This quite impressive long list includes Photoshop CS2 and Guild Wars. A separate 'Gold' list (applications that require some configuration) and 'Bronze' list (those that have minor flaws) also exist. In all, the site provides information about thousands of Windows programs.

Both Ubuntu and Fedora have versions of Wine in their repositories. These are unlikely to be the latest version. The Wine project provides an up-to-date repository itself for Ubuntu. To add it, head over to **www.winehq.org/site/download** and click on the Ubuntu link. The instructions provided are clear and very easy to follow, and essentially involve pasting a couple of commands into a shell.

The process will add a new security key (to verify the packages) and add the new repository so that Wine can be installed using apt-get (or the graphical Synaptic program). No packages are provided for Fedora, although this distribution tends to keep its own official packages of Wine fairly up to date. At the time of writing, the 1.0 release was in the Fedora testing repository.

Once installed, you'll find the Wine configuration utility under the Applications menu. Any Windows applications you install will have their menus created under this new Wine sub-menu. The package will set up the desktop to launch Wine to run any Windows executable (.exe) files just by clicking on them.

Transmission

Both Ubuntu and Fedora have included the excellent Transmission Bittorrent program as standard. This client, which also exists for OSX, is designed to be lightweight, both in

memory and CPU usage, and includes all the features typically needed. Many CD and DVD images are distributed via Bittorrent, and Transmission is configured to handle the protocol without any fuss. The application is rapidly developed, however, and the version installed may be well behind the latest version.

The third-party package site for Ubuntu, **www.getdeb.net**, provides the latest version of Transmission, along with many applications and games that are not part of the Ubuntu repositories, or are not up to date. Ubuntu is configured to handle '.deb' files (software packages) by clicking on the icon. However, Transmission comes as two packages and the 'transmission-common' package must be installed before the 'transmission-gtk' package. It may be simpler to install both from the command line together to avoid any problems with dependencies or conflicts:

```
$ sudo dpkg -i transmission*
```

Replacing supported packages from Ubuntu with unsupported third-party ones can lead to problems and is generally not recommended. In this instance, no other packages are affected and there should not be any issues.

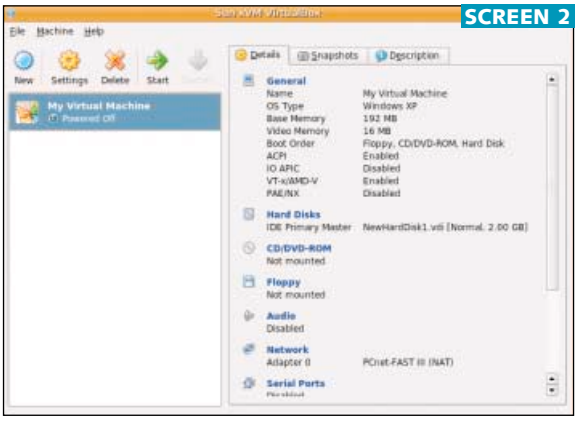
Virtualbox

If you want to install and run another operating system within Linux, Virtualbox (see screen 2) is one of the best solutions for virtualisation. Recently acquired by Sun, Virtualbox is available free from **www.virtualbox.org**. There are several pre-compiled binaries for various platforms. For 32-bit distributions, download the version listed as 'i386'; for 64-bit, it's 'AMD64'.

Virtualbox has good support for several operating systems, including Linux, all versions of Windows and even MS-Dos. The graphical interface

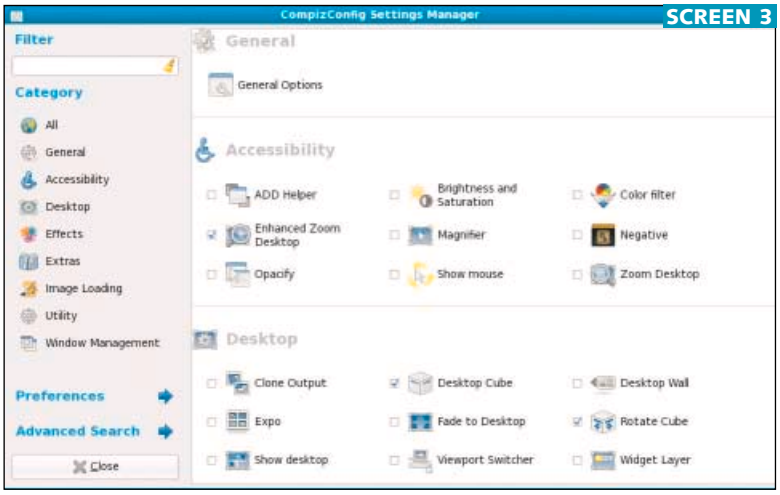
Virtualbox lets you run another operating system under a virtual machine

SCREEN 2



The Compiz Config Settings Manager provides access to all the features of Compiz Fusion

SCREEN 3



is easy to use, and includes a wizard for setting up new virtual machines. Just select which operating system you want to install to get a sensible set of default options, then specify the size of the virtual hard disk and you're away.

A kernel module is required for Virtualbox to run and several pre-compiled ones are included in the binary packages. These are very likely to be out of date, however, so before installing the package, ensure that you have the development tools and kernel headers installed. If they are present, Virtualbox will set up the module as necessary. In Fedora, before clicking the Virtualbox RPM file, run:

```
# yum install gcc make ↙
kernel-devel
```

(Key: ↙ code string continues)

In Ubuntu, you should install the 'build-essential' package. Once the application is installed, you can find the Virtualbox icon under the Applications menu. To access Virtualbox as a regular user, you need access to the special device /dev/vboxdrv. The installation program will set up a group called vboxusers for you, and adding any user to this group will provide the necessary access. You can change group memberships on Fedora and Ubuntu by running the 'Users and Groups' utility under the System menu.

Fedora 3D Desktop Effects

As with Ubuntu, Fedora comes with Compiz, the application responsible for impressive 3D effects, fully installed and ready to use. Fedora supplies its own utility, known simply as Desktop Effects, pre-installed. This basic utility allows you to switch Compiz on and off, and to choose between 'wobbly' Windows and the infamous desktop cube rotation.

In Ubuntu, the Compiz Config Settings Manager (ccsm) is popular (see screen 3); this gives you full control over all the options Compiz has, and allows you to configure all the installed plug-ins.

In Fedora, ccms is available too, but it doesn't work together with Desktop Effects. This is because the two programs use a different mechanism for configuration, so any changes made with ccsm will be ignored by Desktop Effects and vice versa. To get Compiz running with ccms, install the program 'fusion-icon-gtk'. Do this with the Add/Remove Applications program, or at the terminal:

```
# yum install fusion-icon-gtk
```

This package installs an icon under the Applications menu to enable Compiz, and adds a taskbar utility for launching ccsm and switching Compiz off. Installing the package will pull in ccsm automatically if it isn't already installed. You may also want to install the Compiz Fusion Extras package, which adds extra plug-ins, many of which may be less than useful, but visually impressive:

```
# yum install compiz-↙
fusion-extras-gnome
```

The default settings are generally sane, with most of the effects switched off. Most users will want to turn off wobbly windows, and perhaps enable transparency for the desktop cube. I recommend you disable Zoom Desktop and enable Advanced Zoom Desktop instead, as this allows full use of the desktop while zoomed, a feature that's surprisingly useful. Those with Nvidia graphics chipsets may want to disable the Detect Refresh Rate option under General, Display Settings and enter it manually (try 60Hz or 75Hz), as the rate is often detected incorrectly, leading to less smooth operation. **PCW**

Ken McMahon is a freelance journalist and graphic designer. His involvement with digital cameras began with a Commodore 64. He graduated to Macs and now works mostly with PCs.

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Screen grabbing

Everything you ever needed to know about screengrabs, but were afraid to ask

It will come as no surprise that I spend a lot of time making screengrabs, but I'm not alone. For teachers, software developers, bloggers and anyone with a technical support issue, a screengrab is usually worth, if not a thousand words, at least several sentences of description.

There's more than one way to make a screengrab. The PrtScr (Print Screen) key, a relic from the time of MS-Dos, is OK for some things, but what if you don't want the whole screen or you need to see the cursor? Even if PrtScr gives you exactly what you want, you still need to paste the file from the clipboard into an application if you want it saved as a file.

This month, I'll show you how to make screengrabs, capture a sequence of screen actions as a movie and how to overcome a common problem, including movie playback in a screengrab. There are loads of screengrab utilities and you may well have a favourite: mine is Techsmith's Snagit (**www.techsmith.com**). I've used it for *PCW* screengrabs in this column for many years, so aside from Windows' built-in utilities, that's mainly what I'll be talking about here.

I've also recently discovered another Techsmith product for capturing screen movies – Camtasia Studio 5. In the past, my efforts to produce video tutorials have involved the use of screen capture, audio recording and video-editing software. As I recently had to produce some video tutorials for a website, I gave Camtasia a try and was pleased with the results. I've commented on what I think are some of this application's best features at the end of this column.

Windows screengrab basics

The PrtScr key copies the contents of your video Ram to the clipboard. As I said earlier, one of the major drawbacks of PrtScr is that in most circumstances, it doesn't display the cursor. It also copies the whole screen. But if you hold down the Alt Key while pressing PrtScr, only the active window is captured to the clipboard, which can be useful for capturing dialogue boxes and the like.

Windows Vista includes a Snipping Tool you can use to capture the entire screen, selected windows and rectangular and freehand selections. You'll find it on your Start menu in Programs, Accessories. When the Snipping tool is active, Ctrl & PrtScr starts the capture process. A preview window with some crude drawing tools shows the captured area, which you can save as a PNG, GIF, JPEG or HTML page.

SCREEN 1

SCREEN 2

Top: Vista includes the Snipping Tool, which goes a little further than Prt Scr

Bottom: Snagit's profiles provide one-click capture of anything from a window to a scrolling web page

Snagit

There are many screen-capture utilities, but not all are created equal and some do little more than PrtScr. For many years I've used Techsmith's Snagit.

Earlier versions of Snagit had a three-tab panel interface that organised grabbing into Capture, Edit and Organize. I only ever made use of Capture, as the other features are better catered for by other applications. However, in the new version 9 of Snagit, the editing and organising functions have been hived off to a separate Editor application.

Snagit allows you to define capture profiles and includes some useful presets, such as Full screen capture, Window capture and Object capture. The preset profiles make a good starting point for creating your own. The default hotkey is PrtScr, but this can be changed in the preferences. There are four capture modes: Image, Text, Video and Web. Image is the one I use most often and produces a conventional screengrab. I've found the video capabilities of Snagit too limited and the quality of the results insufficient for producing video tutorials, but for a short clip lasting a few seconds, it's usable.

There's also a text option that captures readable text (not a bitmap) from the screen. This is particularly useful if you want to copy text that can't ordinarily be selected, such as your recent documents list, the contents of a menu or an inscrutable error message. The final option, Web, trawls a web page, copies all graphic files and saves them to a folder.

Snagit's Input menu defines exactly what you want to grab and includes – but extends far beyond – the whole

screen and active window options of PrtScr. You can define a region with a rectangular marquee, set a fixed region (useful for recording one screen of a dual-screen setup), capture menus and other objects, and define an irregular screen region with a lasso tool. Scrolling options allow you to capture the entire contents of a scrollable window so you can, for example, create a very long or wide screengrab of a spreadsheet or a long web page.

There are multiple output options; among other things, you can open the grabbed image in your image editor, print it directly, attach it to an email or FTP it. The most useful option and the one I use almost exclusively is to save it to a file. In this case, you can choose a filename or have Snagit automatically apply sequentially numbered ones – for example, Step 1, Step 2 and so on. You can also apply all kinds of effects to the captured screen image, including edge effects and watermarks. More usefully, you can downsample the capture, reduce the colour depth or automatically trim screengrabs. Being able to perform these operations automatically during capture saves both time and effort.

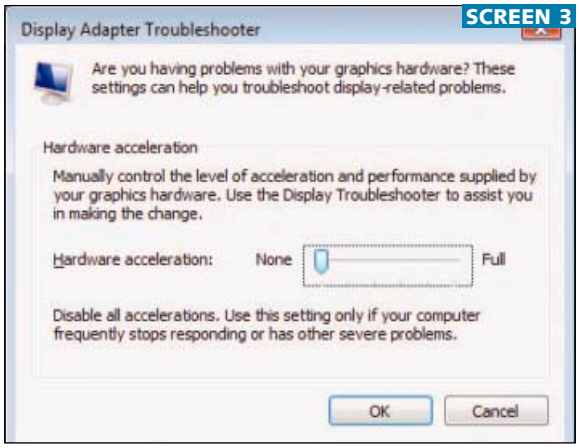
Options buttons allow you to toggle settings such as displaying the cursor, capture preview and multiple capture. This last one is useful for capturing, for example, a menu bar complete with selected menu and sub-menu, and is the kind of thing that would take an age using PrtScr.

One of the problems I always used to have with screengrabs was capturing tooltip windows and other elements that have a tendency to disappear when you press a key. Snagit allows you to incorporate a predefined delay so you can avoid this, and it will even display a countdown so you can get everything set up in good time.

Delayed capture is also useful for capturing processes such as scripts that would be interrupted by keyboard input. You can also use this feature to perform scheduled captures.

Grabbing video

Taking screengrabs that involve video – for example, a software DVD player or video-editing application – can sometimes be problematic. Where the video frame should be displayed, all you'll see is a black or green box. This happens because of the way video applications write to the display to improve performance. They use a dedicated screen buffer in video hardware to render the video frames, which are then overlayed on the display using chromakey. PrtScr and screengrab utilities can't read the hardware overlay, so all you see is the chromakey rectangle that indicates the position of the video.



To capture on-screen video overlays, first disable hardware acceleration

However, there's an easy way around this – turn off the hardware overlay to make your screengrab, then turn it back on when you're done. In Vista, right-click the desktop, select Personalize and click Display Settings. Click on the Advanced Settings button, and then select the Troubleshoot tab, followed by the Change settings button. Next, drag the Hardware acceleration slider all the way to the left towards None. The process is almost exactly the same in Windows XP.

'You'll find that many applications designed to capture a single shot can also do movies'

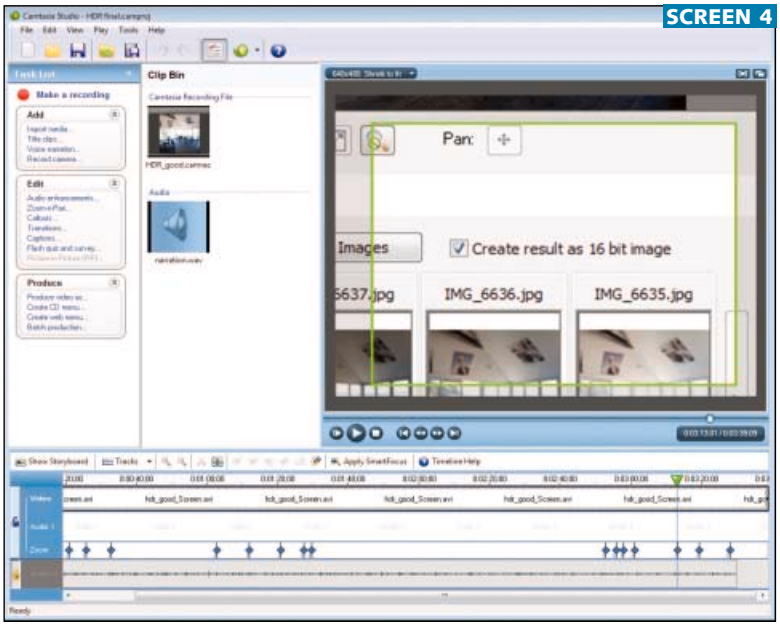
Making video screengrabs

If you want to record a sequence of actions as displayed on your screen to make a movie, you'll find that many applications designed to capture a single shot can also do movies. But while these are OK for short sequences, you'll need something a little more heavy-duty for producing either software demos or video tutorials.

For the past few weeks I've been using Camtasia Studio 5. Making video tutorials isn't something I do on a regular basis, but there are a few Camtasia features that can help you get a more professional end result, without having to spend hours using a video-editing application.

Camtasia allows you to define the area of the screen to be recorded and Techsmith's Screen Capture codec ensures that menu text is readable, even when the video output size is smaller than the original screen resolution. Camtasia lets you record a voiceover either while you make the screen capture, or during subsequent playback. You can also pause the recording whenever you like and there's a really helpful feature that inserts duplicate video frames if your voiceover segment is too long to be accommodated.

Best of all, though, is a tracking feature that automatically zooms in on cursor activity, so your viewers get close-up shots of menu selections, tool applications and the like. All of this is keyframed on the video timeline so you can edit or remove it if it's not what you want. At $299 (about £150) it isn't in the budget category, but you can download a free fully functional, 30-day trial from **www.techsmith.com**. **PCW**



Camtasia Studio provides professional-grade screen video capture and editing

Tim Nott is a full-time freelance journalist. When he's not writing about Windows and word processing, he tackles many other diverse subjects. He currently lives in France with his wife and family.

→ **Comments welcome on the Word processing column.**
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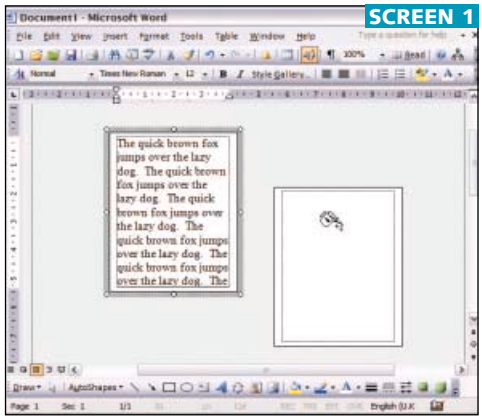
Little boxes

Find out how to manipulate Word's text boxes and use a macro for counting words

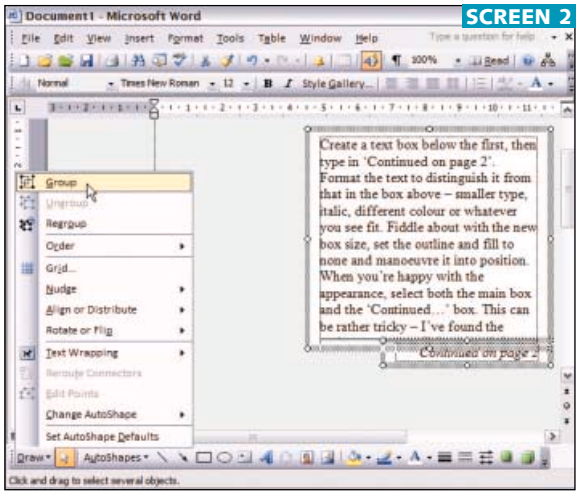
Last month we looked at some of the things you can do with Word's newspaper-style columns and text boxes. However, there's another trick you can perform by linking text boxes. This allows you to have more than one text flow. So, for example, you could start a story on page one and continue it on a later page, independently of the main text.

To link text boxes, select the first one, right-click and click on 'Create Text Box Link'. You'll see the cursor change to a jug. When you move over a second text box, the jug will tip – click on it and the second box will be linked (see screen 1). Any 'overflow' of text from the first box, whether caused by editing or resizing, will appear in the latter, and you can repeat this process to link further boxes.

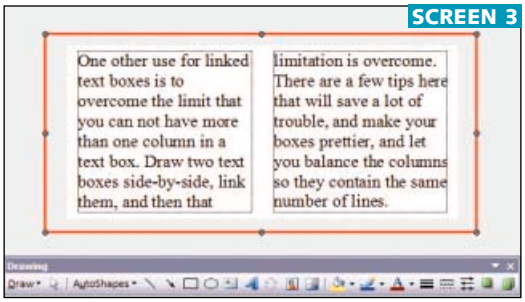
If you're using this to continue a story on a different page, you will notice that there's a snag. You don't have any indication of where the story goes to or comes from – for example, 'Continued on page 2' or 'Continued from page 1'. You could, of course, insert these manually at the end or beginning of the boxes, but then they would be part of the text flow, so wouldn't stay put. Word does have a caption feature for pictures and objects, but as this can be something of a struggle (we'll return to it another time), here's an easier way – create more text boxes.



Pouring text into a linked box



Above: Group boxes to keep them together



Right: Using linked text boxes to make a double-column boxout

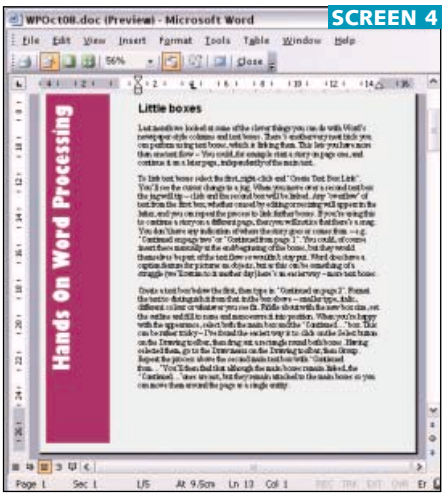
Create another text box below the first, then type in 'Continued on page 2'. Format the text to distinguish it from that in the box above – either smaller or italic type, a different colour or whatever you see fit. Fiddle about with the new box size, set the outline and fill to none, and manoeuvre it into position. When you're happy with the appearance, select both the main box and the 'Continued…' box. This can be rather tricky – I've found the easiest way to do this is to click on the Select button on the Drawing toolbar, then drag out a rectangle round both boxes.

Having selected them, go to the Draw menu on the Drawing toolbar, then Group. Repeat the process above the second main text box with 'Continued from…' You'll then find that although the main boxes remain linked, the 'Continued…' ones are not, but they remain attached to the main boxes, so you can move them around the page as a single entity (see screen 2).

One limitation of text boxes is that you can only have one column of text in them. If you want a two-column boxout as seen on some pages of *PCW*, then why not use two identical linked text boxes side by side? To make the process as painless as possible, and the result as elegant, draw the first box and from the Colours and Lines tab of the Format dialogue box, select 'no line'.

Next, hold down the Ctrl key and drag the box over to the right – you'll get a second box identical in size and formatting to the first. Don't bust a gut trying to get them exactly aligned at the top, as there's an easy way to do this – select both boxes as described above, then from the Drawing toolbar Draw menu, choose Align or Distribute, Align Top. Now group them as before, so you can move the double box around the page and resize it to balance the columns so that they both contain the same number of lines.

If you want to surround both columns with a border line, then don't use the line command from the Drawing toolbar, as this produces an unsightly line between the two columns. Instead use the Rectangle drawing tool to surround both boxes, then set that rectangle to have no fill. Jiggle the size until it looks right, then repeat the Group command to include the rectangle. Once again, you'll be able to move the grouped items as a single item, and then fine-



Add impact with rotated text

tune the size to get perfectly balanced columns (see screen 3).

For those using Word 2007, I'm not going to go through it all again, but here's a quick survival guide. You create text boxes from the Text Box Gallery on the Insert ribbon. The gallery contains a variety of ready-made boxes that may or may not suit or your needs, so you might prefer to use the 'Draw text box' command at the bottom of the gallery, which performs the same as in previous versions. As with Word 2003, you can right-click to link and format them.

Alternatively, you can format a text box from the Text Box Tools, Formatting ribbon that appears when you create or select a box. The Select tool is hidden away at the right-hand end of the Home ribbon – Select, Select Objects. However, holding down Ctrl and then selecting multiple objects by clicking on them with the Text Box Tools Format ribbon active is much easier than the equivalent in 2003 or earlier. To align text boxes with each other, select them both, then look carefully in the Arrange section of the Text Box Tools, Format ribbon – it's the tiny unlabelled icon at the top right. Group is just below it.

On the side

Another cool trick with text boxes is rotating text, which also works in tables. We discussed fairly recently how to use this to create 'tent' place cards, but you can achieve some dramatic layout effects.

A big text box in the margin of a page with a title in it adds impact, but make sure you get it right. The bottom of the boxed letters should point at the main text, so if it's in the left margin, run the text bottom to top, and in the right margin, top to bottom (see screen 4). You can get at the text rotation tool in the Format menu or the Text box toolbar (Word 2003 and earlier) or in the Text panel of the Text box, Format ribbon in 2007.

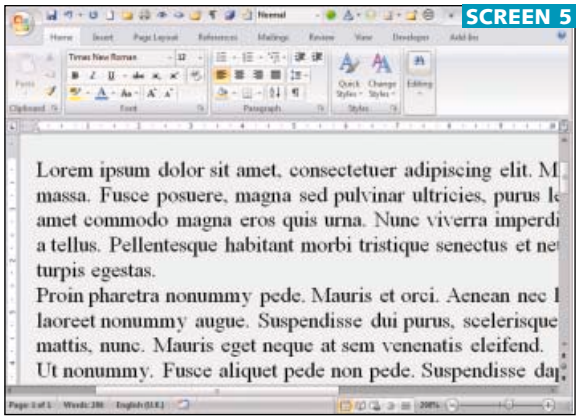
Word curiosity corner

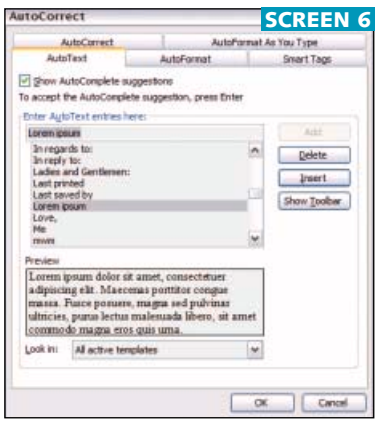
You probably know that typing, on a new line, `=rand(x,y)` followed by Enter, produces x paragraphs each consisting of y sentences of 'The quick brown fox…'. In Word 2007, the fox doesn't appear – you get sample text beginning with 'On the Insert tab, the galleries include items…'. You can, however, get the fox jumping again with `=rand.old(x,y)`. Alternatively, should you want something more erudite, `=lorem(x,y)` produces some Latin instead (see screen 5).

In the tradition of such things, this 'Latin' is largely nonsense, as you'll see if you feed it into an online translator. In all versions of Word, Autocorrect must be enabled for this to work – make sure the 'Replace text as you type' is checked in Autocorrect options. In 2007, you'll find this under Office Button, Word Options, Proofing.

There is, of course, nothing to stop you creating your own dummy text in any version of Word, should you tire of the fox and the dog. Type or paste the text, then select it. Go to Insert, Autotext, New and give it a name – or accept the suggested name (see screen 6). Click OK, and the text will be stored. To retrieve it, either go to Insert, Autotext, Autotext… then select it from the list, or more simply, type the name you gave and press F3. You can't specify the number of sentences or paragraphs this way, but you can hit Ctrl & Y to repeat the insertion.

Show off your Latin in Word 2007





Create your own dummy text

Out for the count

In July we looked at the vagaries of the word count command in Word and other applications. Tim Watson wrote in to say Word 2003 and earlier do not count words in text boxes, callouts or other shapes, nor in embedded objects, headers and footers. Counting text in endnotes and footnotes is an option in the word count dialogue, and Word 2007 does add text boxes to the countable options, but it's all or nothing, so you can't count text boxes but not footnotes.

In previous versions, word count will not include the contents of text boxes in a document, but will count a selection made inside a text box. So you could run a word count, write the figure down, select the contents of the first box, run a word count, write that down, repeat for the other text boxes, then add the figures – and wonder why you bothered to buy a computer. Fortunately, there's a way to do this with a macro:

```
Sub CountAll()

Dim Numwords As Long
Dim n As Integer
Dim Boxwords As Range
Dim Boxwordcount As Long
Dim Totalboxwords As Long

Numwords = ActiveDocument.↙
BuiltInDocumentProperties ↙
(wdPropertyWords)
For n = 1 To ↙
ActiveDocument.Shapes.Count
Set Boxwords = ↙
ActiveDocument.Shapes(n).Text↙
Frame.TextRange
Boxwordcount = ↙
Boxwords.ComputeStatistics↙
(Statistic:=wdStatisticWords)
Totalboxwords = Totalboxwords ↙
+ Boxwordcount
Next n
Numwords = Numwords + ↙
Totalboxwords
MsgBox ("The document has " & ↙
(Numwords) & " words.")

End Sub
```

(Key: ↙ code string continues) **PCW**

Stephen Wells is a freelance journalist and a regular contributor to computer magazines. He's been writing PCW's Spreadsheets column for over 10 years.

→ Comments welcome on the Spreadsheets column.
Email spreadsheets@pcw.co.uk
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Pivot Tables explained

Explore how Excel's Pivot Table can help you to make sense of your data

Whether you call it a table, list or flat-file database, a series of records all neatly split into the same fields forces a disciplined order upon a mass of related data. But it doesn't necessarily help you to analyse it.

That's where an Excel Pivot Table is so useful. It allows you to look at the same information in many different ways. You can not only group and summarise the data, but also add depth to it. You can tell Excel which of the fields in the list are to be arranged in rows and columns. You can also designate a page field that seems to arrange items in a stack of pages. You can add a calculated field and twist all the data around, hence the Pivot.

It's true that with Grouping and automatic Subtotalling, Excel allows you to collapse tables and provide simple summaries on a worksheet, but a Pivot Table lets you drag and drop your columns. It's much more flexible for analysing information and discovering hidden relationships. The only limitations are that the table of data must include one column that has duplicate values and, in general, some numeric information.

As an example, screen 1 shows a shortlist of winners of pigeon races. There are four fields and 35 records covering fictional weekend races from 17/5/08 to 26/7/08. To start the Pivot Table Wizard, click within the list and, in Excel versions prior to Excel 2007, choose Pivot Table Report on the Data menu. After an initial dialogue box that confirms the range to use, you are offered a diagram. If you follow this example, you'll see the fields from the table in screen 1 listed.

You can drag Member to where it says Column, Pigeon to where it says Row, and Winnings to where it says Data. This label will automatically change to Sum of Winnings. Click Next and choose whether to have the Pivot Table on the same worksheet or a new one. Click Next and your Pivot Table appears.

	A	B	C	D
1	Race date	Member	Pigeon	Winnings
5	17/5/08	Pam	Bred	£ 75.00
6	17/5/08	Peg	Purchased	£ 50.00
7	17/5/08	Ron	Purchased	£ 50.00
8	31/5/08	Sam	Bred	£ 75.00
9	31/5/08	Bob	Bred	£ 25.00
10	31/5/08	Dot	Bred	£ 50.00
11	31/5/08	Gus	Purchased	£ 75.00
12	7/6/08	Meg	Bred	£ 25.00
13	7/6/08	Pam	Purchased	£ 50.00
14	7/6/08	Peg	Bred	£ 25.00
15	7/6/08	Ron	Purchased	£ 75.00
16	7/6/08	Sam	Bred	£ 50.00
17	5/7/08	Sid	Bred	£ 25.00
18	5/7/08	Val	Bred	£ 25.00
19	5/7/08	Dot	Bred	£ 75.00
20	5/7/08	Gus	Purchased	£ 50.00
21	5/7/08	Meg	Purchased	£ 50.00
22	5/7/08	Pam	Bred	£ 75.00
23	19/7/08	Peg	Bred	£ 25.00
24	19/7/08	Ron	Bred	£ 50.00
25	19/7/08	Sam	Purchased	£ 75.00
26	19/7/08	Bob	Bred	£ 25.00
27	19/7/08	Dot	Purchased	£ 50.00
28	19/7/08	Gus	Bred	£ 25.00
29	19/7/08	Meg	Purchased	

SCREEN 1

A simple table recording pigeon race winnings

More options in Excel 2007

Click within the list as before. Choose the Pivot Table button under the Insert tab. After the initial dialogue box confirming the range, you'll see the fields listed in a pane called the Pivot Table Field List. Below are four labelled rectangles. You can drag the fields into these rectangles: Member to Column labels; and Pigeon to Row labels as before. What used to be called Data is now called Values, so drag the Winnings field there (see screen 2). The Winnings will still be summarised in the last rows and columns of the table as before and totalled by default.

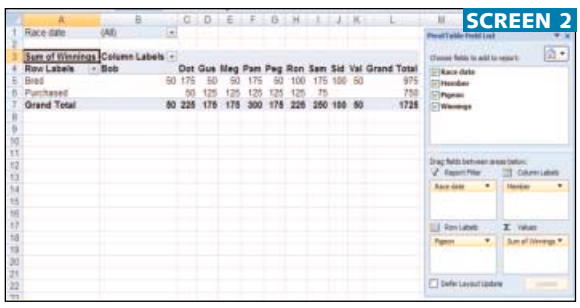
The additional rectangle is labelled 'Report Filter'. This enables you to page through data summaries. Drag the Race date field there. Now you will be able to see the results for a particular race day, or all the results in a particular month.

You'll see that the Pivot Table Field List box has a number of dropdown arrows. The one at the top right of the box offers you various layouts of the box itself. By default, your table's fields are listed above four drop zones at the bottom of the box. The arrow offers other arrangements – for example, the drop zones to the right of the field list. The arrows next to the labels for the drop zones allow you to move a field from one zone to another. You can also do this by dragging a field label from one zone rectangle to another.

You can now close the Pivot Table Field List box and examine the Options ribbon of the Pivot Table Tools tab that appears whenever you create a new Pivot Table or click an existing one. At the right-hand end there is a Field List button for displaying the Pivot Table Field List box at any time, a plus and minus (+/-) button to expand or collapse groupings, and a Field Headers button to display or hide the column and row labels.

The first thing that needs fixing, however, is the format of the winnings' values. Probably the easiest way to do this is to highlight all of them – simply

Drag fields into the rectangles at the bottom right



SCREEN 2

SCREEN 3

	A	B	C	D	E	F
1	Race date	(Multiple Items)				
2						
3	Sum of Winnings	Column Labels				
4	Row Labels	Dot	Meg	Pam	Sam	Grand Total
5	Bred	£75.				.00
6	Purchased	£50.00	£125.00	£75.00	£75.00	£325.00
7	Grand Total	£125.00	£125.00	£175.00	£125.00	£550.00
8						
9						
10						

Value Filters (in order)
1. Member: Sum of Winnings is greater than 100

Finding the leading prize winners

right-click and choose Format Cells, Number, Currency, just as you would on an ordinary worksheet.

To change the colour scheme of the whole Pivot Table, click anywhere in the table. Under the Pivot Table Tools contextual tab, choose the Design tab. To the right of this ribbon are seven light styles. You can click an arrow beside them to view a wide choice of light, medium and dark styles. To view even more styles, under the Pivot Table Tools contextual tab, click the Page Layout tab and then on the Themes button.

If you want to see how a style will look, choose the Office button, Excel Options, Popular, and then check Enable Live Preview. Another feature of Excel 2007 is that its Pivot Tables promise to maintain their formatting when they are refreshed to include new data. Previous versions tended to lose their formatting easily. With enough changes to a Pivot Table, this promise can be broken, though.

Back to our pigeon racers. Although the Members weren't listed in alphabetical order in the original list, they are on the new Pivot Table, and the results for all of them are displayed. Click within the Pivot Table. Under Options, click Headers to display the label down arrows – now you can easily separate the winners from the featherweights, even within a month.

Click the arrow beside 'Race date'. Check the dates in July. Click the arrow by Column Labels and choose 'Value Filters Greater than' and enter 100. This cuts the example list down to Dot, Meg, Pam and Sam. Those members were the leading prize winners in July (see screen 3).

To return to the full table, click on the arrow next to Race date and select All. Next, click the arrow by Columns Labels and then choose Value Filters, Clear Filter.

Supposing you want to see the average prizes rather than the totals. Click in the Pivot Table to see the Pivot Table Tools contextual tab, then on the Options tab. Click the Field List button. Click the arrow by 'Sum of Winnings' in the Values box.

Choose Value Field Settings. Select Average and then OK. The Pivot Table will show the average winnings for both bred and purchased pigeons for each member. Backtrack through those actions to return to totals.

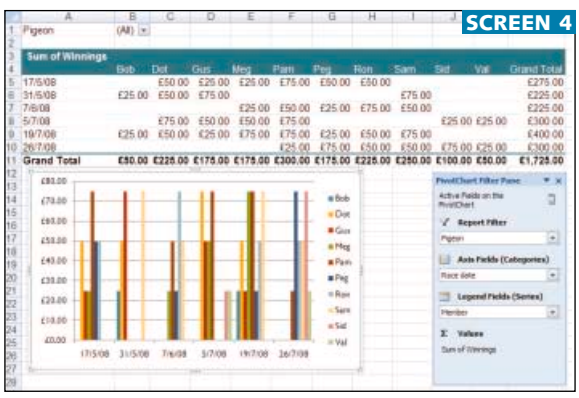
'You can tell Excel which of the fields in a list are to be arranged in rows and columns'

Incidentally, if you have a huge Pivot Table, with thousands of records that take a long time to refresh, you can check the Defer Layout Update box in the Pivot Table Field List dialogue box. The Pivot Table won't refresh until you are ready.

A different view

To demonstrate that a Pivot Table can display data in a variety of ways, open the Pivot Table Field List dialogue box and drag the fields around so that the Pigeon field is in the Report Filter box, Race date is in the Row Labels box (leaving Member in the Column Labels box), and Sum of Winnings in the Values box.

SCREEN 4



You can display the results in a Pivot Chart

This arrangement of the Pivot Table lends itself better to making a Pivot Chart. Click in the Pivot Table. In the Tools group, under the Options tab, click Pivot Chart. Click on the first Column chart option and a chart will appear, together with a Pivot Chart Filter Pane, as shown in screen 4.

In this pane, you have a multitude of options for changing the Report Filter or the Axis and Legends fields. Any changes you make are shown instantly, not only in the chart, but also in the Pivot Table.

Supposing the club, a racing association or a taxing authority decides to take a percentage of each prize. It's easy to add a column to the Pivot Table to reflect that. Click inside the Pivot Table. Under Pivot Table Tools, choose Options, Formulas (in the Tools group) and Calculated Field. In the resulting Calculated Field box, enter a new field name such as Charge. In the Formula box, enter

```
'Winnings'*5%
```

Click on the Add button and then on OK. For each entry of a prize, an additional entry of the charge is shown. Any time you wish to remove it, just display the Pivot Table Field List dialogue box and drag the Charge field out of the Values area and onto the worksheet. The Charge field will still be included in the list of fields above, so you can include it again at any time.

To see even more ways that you can personalise an Excel 2007 Pivot Table report, open the Pivot Table Options dialogue box at the far left of the Options ribbon. Here you can control many aspects of filtering, displaying and printing your Pivot Table. **PCW**

Niall Magennis has been dabbling in Midi and digital audio since the days of the Atari ST. He writes for a number of music magazines and lives in London in a flat overrun with music equipment.

→ **Comments welcome on the Sound column. It returns in the December issue.** Email sound@pcw.co.uk *Please do not send unsolicited file attachments.*

Flanging and phasing

A lesson on making the most of modulation effects in your music

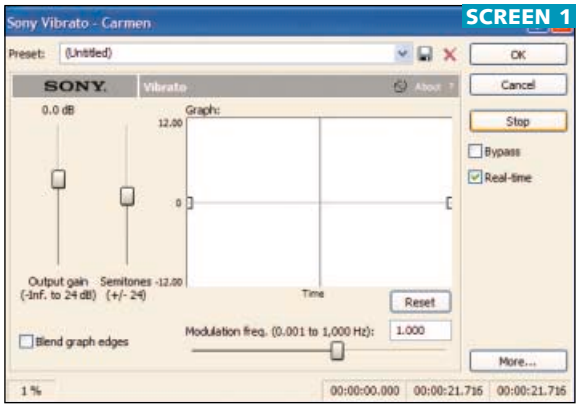
Back in the August issue, we started to take an in-depth look at audio effects and how you can best use them in your music. In that issue we covered distortion, delay and reverb. This month we're going to finish off by taking at look at modulation effects such as phasing, chorus, flanging and pitch vibrato, while also touching on pitch shifting.

Whereas distortion, delay and reverb have an obvious 'in your face' influence on your audio, modulation effects tend to sound more subtle. Nevertheless, they are key elements of many types of music, including reggae, trance and 1960s-style psychedelica. However, because the controls on modulation effects are often labelled with obtuse terms such as frequency, depth and rate, they can be a bit tricky for novices to get their head around. But don't worry because we're going to explain how the effects create their distinctive sound, describe what the various controls do and give you some tips on how to make the most of them in your music.

One of the great things about modulation effects is that they are quite simple for today's computers to create. This means the plug-ins that create these effects don't take up much processing power, so generally you can get away with using as many of them as you like, even on slower computers.

Vibrato

Effects such as chorus, phasing and flanging are called modulation effects because they are created by using a process known as pitch modulation. To create this pitch modulation, a low frequency oscillator (LFO) is used. An LFO is like the oscillators used in synthesisers to create sound, except with an LFO the frequencies are so low that they can't be heard by human ears. However, an LFO is useful because it can be used to influence other elements of a sound. In the case of pitch modulation, the sound is first delayed by a few milliseconds and then the LFO is used to modulate this delay time.



Vibrato is the simplest of all the modulation effects

The most basic type of pitch modulation effect is vibrato (see screen 1). That's because it uses the LFO to modulate the frequency of the sound to create the familiar vibrato pitch wobble. Unlike other pitch modulation effects, vibrato only uses the modulated signal. The controls on a vibrato plug-in are usually simple, with the rate dial controlling the speed of the vibrato and the depth setting governing the depth of the pitch modulation.

All the more complicated forms of modulation effects mix the modulated signal back into the original signal to create their distinctive sound. This is the reason people generally use the effect's own wet/dry controls rather than trying to control the wet/dry mix via a send/return loop.

Flanging

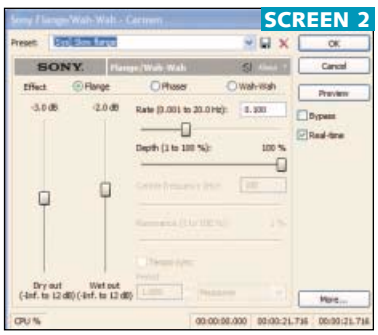
Flanging is probably the most pronounced of the modulation effects, as its comb filtering-type sound leaves a strong impression on the resulting audio. Like all the effects in the modulation family, it first delays the audio signal by a few milliseconds and then modulates this delay time using an LFO. However, flanging also adds some of the processed sound back into the effects loop. The feedback control is used to vary the amount of the processed sound that re-enters the loop and as you add more feedback, the comb filtering effect of the flanger increases dramatically (see screen 2).

Typical controls on a flanger include rate, feedback and delay. A flanger's rate control sets the rate or speed of the flanger's frequency sweep. The feedback dial dictates how much of the processed audio is fed back into the effects loop. The higher the setting, the more metallic sounding the effects will be. Finally, the delay control affects the frequency range of the flanger's sweep by adjusting the initial delay time.

As flanging is a dramatic effect, you'll usually want to use it sparingly. Use too much of it and the listener may become bored and irritated by the sound. However, it has been used quite liberally on some songs in the past, usually during the 1960s. The Beatles' track *Tomorrow Never Knows* from *Revolver* was one of the first commercial songs to make use of it.

Chorus

Chorus is created in a similar way to flanging. Again, an LFO is used to modulate the delay time. However, a



Flanging is quite a dramatic effect, so should be used sparingly

Pitch shifting

Pitch shifting is useful for creating quick and dirty vocal doubling

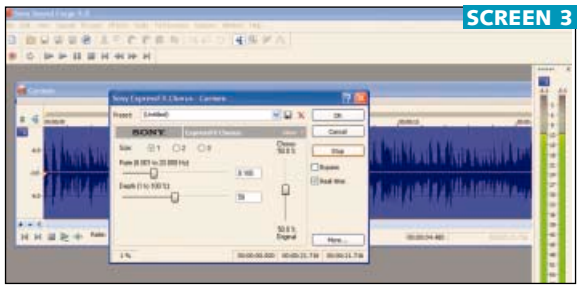
Although the pitch shifter effect has been superseded in modern audio sequencers by more complicated and realistic-sounding time-stretching algorithms, the effect is still used as a way of doubling up vocals or creating interesting special effects.

A traditional pitch shifter works by cutting the incoming audio into short pieces and either lengthening each of these sections when the pitch is being shifted downwards or shortening them when it's shifted upwards. Usually some kind of cross-fading is used on each piece to make it less obvious the audio is being sliced.

Pitch shifters only really manage to sound 'natural' when they're working on modest changes in pitch, not more than a couple of semi-tones. Pitch up too far and you'll end up with a chipmunk-type sound; pitching down too much will result in a Dalek-style vocal.

Most pitch shifters always change pitch by the same number of semitones or cents, no matter which notes they're dealing with. This means they can only really be used on settings for parallel fourths, fifths or octaves, as using other interval settings normally sounds 'off', because they don't follow the usual music scales in use in western music.

However, pitch shifters are still useful for thickening up vocals. You can shift two copies of a vocal track up and down by four or five cents and mix them in with the main vocal to create a more layered sound. The limitations of pitch shifters can be also put to good use. For example, a common trick is to run a drumbeat through a pitch shifter with an extreme setting to give a very robotic, metallic sound.



SCREEN 3

Chorus can be used to add a more dreamy sound to guitars or synths

chorus effect doesn't feed any of the processed signal back into the effects loop. Instead, it generally uses longer delay times and this, combined with the lack of feedback, makes it a more subtle effect.

Chorus is generally used as a stereo effect. Stereo chorus is produced in much the same way as the mono version, except that the delay created by the LFO is varied between the right and left audio channels. Stereo chorus sounds more dramatic than mono chorus, as it is spread more widely across the stereo field.

Typical controls on a chorus plug-in include delay, depth/width, waveform/shape and speed or rate. The delay dial controls the amount of initial delay introduced by the chorus effect. Typical delay times range between 20ms and 30ms, and when a chorus is working with very short delay times, it will behave as a flanger. The depth or width setting controls how much the delay time changes over time. On larger settings, the chorus will start to introduce a warble-type effect into the sound. The waveform or shape dial selects the waveform used to control how the delay changes over time, while the speed or rate settings control the speed at which the LFO waveform repeats.

Chorus is often used to create a more dream-like guitar sound (see screen 3). Over the years, it has been a staple of Goth music. The Cult used it heavily on tracks including *She Sells Sanctuary* and *Rain*, while other Goth bands such as the Sisters of Mercy and The Mission also used the effect with gusto. It's also often used on vocals and synth sounds as a quick and easy way of thickening them up. However, like reverb, chorus can have the effect of pushing the sound away, so you have to be careful not to use too much of it and end up sending the sound you are processing to the back of the mix.

Phasing

The final effect in the modulation family is phasing. It makes a pronounced filter sweep-type sound. It's created in a very similar way to chorus and flanging, as it's based around an LFO modulating the delay time of the affected signal. However, phasing uses much shorter delay times than either chorus or flanging, although it does use feedback in a similar way to flanging to increase the depth of its sweep (see screen 4).

A phaser typically has two main controls – feedback and rate. You use feedback to dictate how much of the processed signal is fed back into the effects loop. The more feedback, the more pronounced the effect. The rate setting controls the speed of the LFO, which in turn controls the speed of the modulation sweeps. Some phasers also have frequency and depth dials.

Phasing is a very popular effect and it's commonly used on guitar parts in reggae tracks and guitar solos in rock music. It can be heard in prominence on tracks such as *Itchycoo Park* by the Small Faces.

Hopefully, this column will have given you not just a better grounding in how effects work, but also a bit of inspiration on how best to use them. The best advice we can give when adding effects to your tracks is that the old adage of 'less is more'. Otherwise you may end up losing your track in a haze of sonic fireworks. **PCW**

SCREEN 4

Phasing gives a pleasing filter sweep sound, making it popular in reggae and trance tunes

Alan Stevens has implemented and supported networks for over 25 years, working for IT vendors, system integrators and customers. He now mostly researches and writes about networking matters.

→ Comments welcome on the Networks column.
Email networks@pcw.co.uk
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DIY Windows Home Server

How to put together your very own Windows Home Server

I thought it was about time I started to get some hands-on experience of Windows Home Server (WHS), especially now that the first service pack (sorry, 'Power Pack') is available for the platform.

Of course, I could have followed the easy path and got hold of an HP Mediasmart Server, or one of several other ready-made products now available. But that would have been too easy, and wouldn't have provided a full insight into the software and how it ticks. So, instead, I opted for the do-it-yourself route and built a server of my own, which proved an interesting experience.

The easiest way of deploying Windows Home Server is to buy a ready-made system, such as the HP Mediasmart

Soft and hard issues

The first hurdle to overcome was getting hold of the software, which comes on three discs – a server installation DVD plus CDs for client setup and recovery of crashed PCs. However, unlike other Microsoft products, you can't get these via MSDN or Technet, which is where most developers, enthusiasts and journalists like me would start.

For most people, that means spending money to get the software. A 120-day trial version is available for the cost of postage (£4.58) from **www.tinyurl.com/5dx9kd**, but eventually it has to be activated, otherwise it stops working. Ignoring illegal activation hacks and other workarounds, a full 10-user licence costs around £90 to £100, depending on where you buy it.

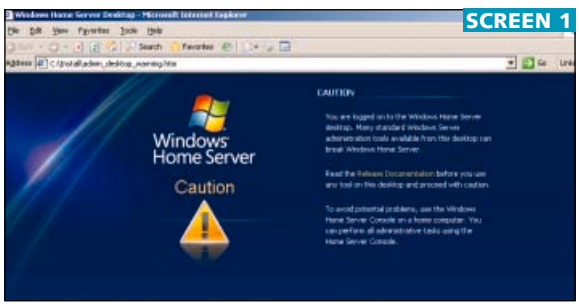
Fortunately, I'm a member of Microsoft Connect and take part in a number of product evaluation programs, including Home Server, so I got an evaluation copy that way, which just left me with the hardware to sort out.

Now, the temptation with a product like Home Server is to recycle an old PC rather than buy a new one. That's a temptation I admit I succumbed to, starting first with an ancient Pentium 4 machine that readily booted the server DVD, but proved not to have enough hard disk space to go any further; at least 65GB to 70GB is required (note to self – must read manuals first) and my PC only had a 40GB ATA disk. Still, undaunted, I fitted a Sata Raid adapter left over from a review, plus a new 120GB hard disk and rebooted from the DVD.

Unfortunately, Home Server (effectively an implementation of Windows Server 2003 with Service Pack 2) didn't have a suitable driver for the new adapter. As it uses its own Drive Extender technology (more on this shortly), it turns out that hardware Raid is frowned upon. So, I eventually gave up on that PC and tried another.

This was a lot newer than the first one, so the software loaded fine on the second PC and I soon had what looked like a working Home Server. On closer inspection, however, I found that the installer hadn't been able to identify the network adapter, so I couldn't connect to the Lan (a real problem on a server). Neither could the PC work out what video card was being used, so it was using a default. Nor could it identify the soundcard, although that wasn't so important.

Although you can manage Home Server locally, it's discouraged – remote management is the preferred approach



Fortunately, these problems were very easy to fix. The PC was a Dell Dimension, so I visited the Dell website, tapped in the service tag and there were all the drivers waiting to be downloaded. They all worked, even though they were for a desktop PC running Windows XP, not a Windows 2003 Server. On others I might not have been so lucky and could have spent fruitless hours chasing non-existent software. That's definitely something worth bearing in mind if you're interested in Home Server. Indeed, if driver hunting doesn't appeal to you, you'll be much better off going for a ready-made server (see the WHS group test, *PCW* July 2008).

So let me in

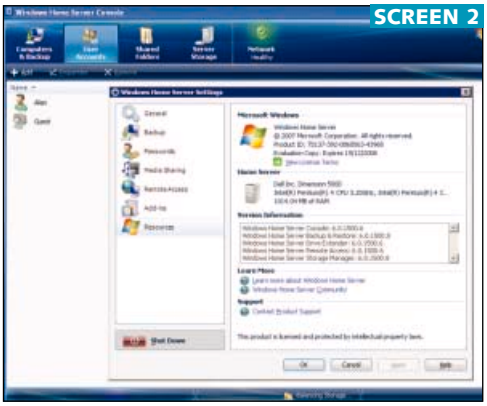
My PC had its own monitor, keyboard and mouse, but Home Server is really designed to run 'headless', with no local user interface and with everything managed remotely. You can manage it from a local console, but a stark message is displayed warning what can happen if you stray outside the user-friendly management console (see screen 1).

Therefore the next step was to configure a client PC with the custom connector needed to both fully use the Home Server and run the console. That meant running the setup program from the client installation CD, although the connector software is also to be found on the server, in network shares that can be browsed in the conventional manner, even without the client software installed.

A minimum of Windows XP with SP2 is required here – Home, Professional, Media Center or Tablet editions. You can also install the connect software on any of the Vista releases, apart from 64-bit versions, for which you need the Power Pack 1 update. Still in beta at the time of

writing, I'll look at what that has to offer in a future Hands On.

In my case, I chose a virtual PC running XP Pro, the installation taking just a couple of minutes and leaving me with a desktop shortcut to the server's shared folders, plus a Home Server tray icon containing links to a number of tools, including the management console (see screen 2).



SCREEN 2

As you can see from this screen of the Home Server console, I installed the software on a Dell Dimension 5000

A number of tasks need to be performed here, one of the most important being to configure user accounts and passwords. For seamless operation, these should match the credentials used to log on to the client PCs, otherwise you'll be asked to log on again every time you try to access a server share.

Extended drives

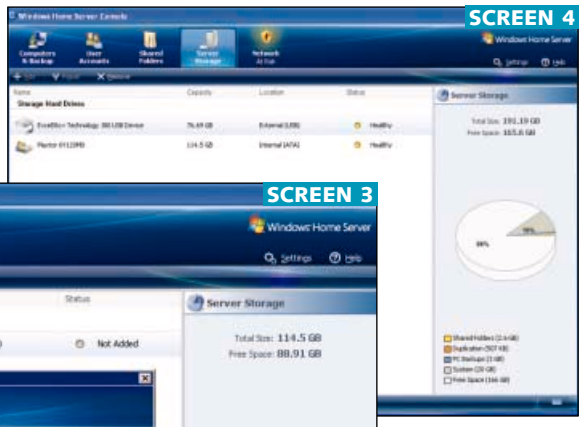
Shared storage is one of the key selling points of Windows Home Server and one of its main features is the ability to treat storage as though it were one big bucket into which files can be saved, rather than having to deal with individual disks and drive letters.

The technology behind this is called Drive Extender and it really does make it easier to find information, with no need to know which drive a file or folder is on. It also makes it easier to add or replace disks on the server, as Drive Extender makes no distinction between internal and external devices, doesn't care what type of disk is involved or how big or fast it is. The available space is simply pooled, with 20GB reserved for the operating system or system partition, and the rest being used for data. For example, I was able to plug an 80GB external USB disk into the server and, using the wizard provided, add it to the available storage pool (see screen 3). The disk was wiped and reformatted as part of the process, but was very quick and I immediately had an extra 76.69GB of space to store files on (see screen 4.)

With more than one disk added, I was also able to take advantage of folder duplication, another Home Server feature provided courtesy of Drive Extender. Available on a per-folder basis, this simply replicates the contents of the folder to other disks so that, should a drive fail, your data will still be available.

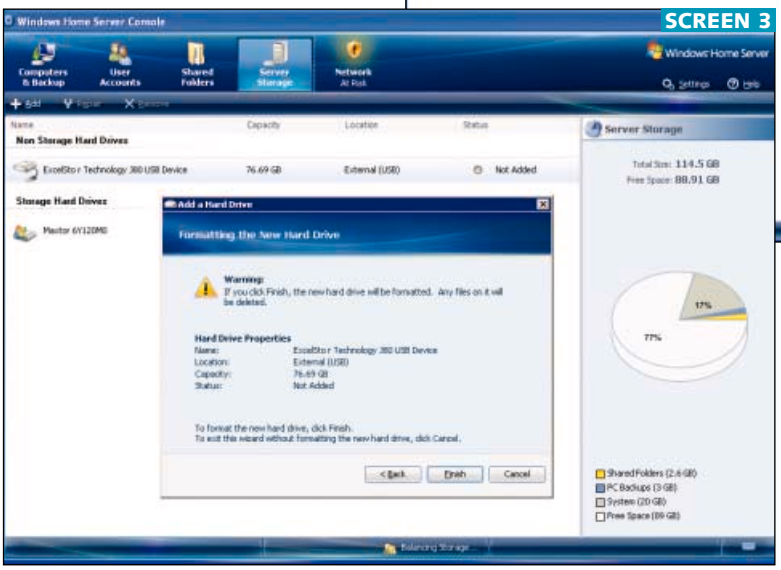
Naturally, the copies take up space, but that's a small price to pay, and the replication is all handled in the background, with no real impact on server activity. All you have to do is tick the box marked 'Enable folder duplication' on the folder properties in the WHS console.

According to Microsoft, older USB 1.1 drives are too slow and should be avoided, and you shouldn't plug more than one disk into each controller, so USB hubs should be shunned too. Out of interest, I also plugged in a USB memory stick to see if that could be added to the WHS storage pool. It couldn't, but I was able to attach a removable storage drive, pop in a cartridge and add that, which could be a useful option.



SCREEN 4

Once the USB disk has been added, the Home Server reports 191.19GB pooled disk space



SCREEN 3

Here I'm adding an 80GB external USB disk to the storage pool on my Windows Home Server

Other options

I also checked out the client backup facilities, which work as expected, and started to look at the remote access facilities, designed to let you connect to your Home Server when you're out and about. Some setup work is required for this, but if your internet router supports Universal Plug and Play (UPnP), much of it can be done automatically. At least that's the theory – mine wouldn't play ball, something I'll need to look into further and report back on. Indeed, I intend covering Home Server in a lot more detail in future issues.

In the meantime, I just want to close by giving a pat on the back to O2, whose broadband service I switched to while playing with Home Server for this article. Not that there was anything wrong with my previous ISP, with whom I'd been with for more than two years. However, with O2 putting its equipment in my exchange, I was suddenly given the option of moving from a BT-sourced ADSL Max service to ADSL2+ and paying half the price for the privilege.

As it felt like an offer too good to pass up, I expected a few problems and prepared for the worst, but the handover was almost transparent and the customer service excellent. In the run-up, I was bombarded by texts and emails telling me what was going on and on the day, my previous service went down at around noon and the new one came up 30 minutes later. The wireless router supplied (an O2-badged Thomson) connected first time and instead of my usual 2Mbits/sec, I was getting almost 6Mbits/sec, with double the upload bandwidth too.

I did lose service for a few hours a couple of days later, but the freephone tech support service was friendly and efficient, and the problem was soon sorted. An excellent result and so far I'm impressed. **PCW**

Mark Whitehorn is one of those lost souls who actually likes databases. He splits his time between consultancy, writing, working for two universities and tinkering with old cars.

→ Comments welcome on the Databases column.
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Devices and desires

A mobile broadband USB stick tested and a solution to a speed-critical problem

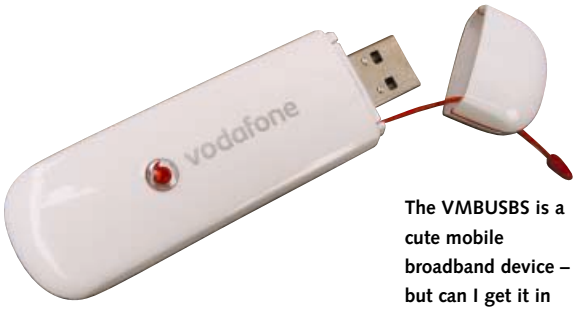
Advertising exists to influence other people, not me. Yeah, right. A long while ago, I saw an elderly gentleman being interviewed about his preferred beverage and whether his choice was influenced by advertising. He said he drank Guinness not because of the advertising, but because it was good for him. Guinness' PR agency must have been delighted.

I, however, feel able to confess: my eye was caught by the advertising campaign showing Vodafone's Mobile Broadband USB stick zooming its rocket-powered way around the galaxy. So now I have one and have been playing with it, and it's fabulous.

But what's it got to do with databases? Client-server databases are great, because the required bandwidth is reduced: you send a tiny SQL string to a large complex database, the processing is done centrally and the database sends the answer back to you as a set of data. This is a huge advantage, especially for remote connectivity, and so the theory is that you don't need much in the way of bandwidth to make a connection.

Unfortunately, though, the world is changing. First, databases often hold large collections of images. Several people have apparently died trying to download a 35MB image with a 56K modem. Second, it is increasingly common to administer and drive databases remotely, something I do all the time. All of which makes a high bandwidth connection essential no matter where you are – hence my interest in mobile broadband.

The VMBUSBS is a delightful device: it's easy to install, works seamlessly with all the existing network gubbins on my laptop and picks up a signal automatically. For each session, all it asks is whether you want a connection: say 'yes' and away you rocket. You can do all the usual tasks, such as pick up email and download files, as well as administer that database. The only problem with the VMBUSBS might be 3G coverage – where I live in the countryside, there is none – but in practice, it hasn't been an issue because I only need mobile broadband when I'm away. In the cities I've visited, coverage has been good and the device is capable of swapping down to 2G if necessary.



The VMBUSBS is a cute mobile broadband device – but can I get it in black please?

You pay for the service, of course, starting from £15 per month for 3GB download (visit **www.vodafone.co.uk** for details). Still, the device could easily be worthwhile if you work away from base, especially given the variation in hotel internet connection prices (anything from free to £20 and more for a night). And however hard you try, you can't use your hotel connection on a train.

I'm writing this at the enthusiastic early stage of our relationship, so I'll also report on how it settles down in a month or three.

Slot machine

An interesting question came my way during some recent consultancy work. A factory has a heavily used machine, so its time is allocated using a booking system. (In practice, there are many machines, but we'll simply consider one of them). Each eight-hour working day (9am to 5pm) is split into 32 quarter-hour slots. The machine is bookable in multiples of 15 minutes, so, for example, it might be booked from 9.45am to 10am (slot four) or from 9.00am to 11am (slots one to eight). There is no requirement to record who has booked it, but an overriding requirement is that the speed of retrieval of the next available time slot must be blisteringly fast. In other words, people often ask: "When is it next available?" and/or "When is it next available for three-quarters of an hour?" and want the answer immediately.

A first design of the table to hold the booking information might look like screen 1. It's a nice normalised table, intuitively easy to understand and it's very easy to query to find out, for example, if slot four is free or booked on the first of September.
If the query:

```
SELECT BookingDate, SlotNo
FROM DefaultBookings
WHERE (BookingDate=#9/1/2008#) ↙
AND (SlotNo=4);
```

(Key: ↙ code string continues)

returns a value, then the slot is booked. (The SQL is using American date format.) This works fine, but you have to know which slot you're looking for before you run the query, and this isn't the only sort of question

SCREEN 1

DefaultBookings

BookingDate	SlotNo
01/09/2008	1
01/09/2008	2
01/09/2008	4
01/09/2008	20
01/09/2008	21
01/09/2008	22
	0

Record: 6 of 6

This is a default data structure for holding bookings of 15-minute slots

outlined in the design brief. In fact, to answer the question "When is it next available?", we have to query for values that aren't in the table. A human can glance quickly at the table and see that the next free slot is three, but extrapolating missing values in a sequence will make for a slow query.

We could try inverting the logic behind the table design. We want to find free time slots, so let's try storing the free slots and removing them from the table once they're booked (see screen 2).

This makes it much easier to find the first empty slot. However, there is a second problem that neither solution solves. How do we answer the question: "When is it next available for three-quarters of an hour?" Suppose that we query the table and find that slot three is free. We then have to test to see if the subsequent two slots are also free. The sticking point here is that there is no facility in standard SQL for identifying the 'next' row. Rows of data in a relational database are inherently unordered, so we cannot use the relative position of rows to retrieve the answers we need.

The solution I came up with is to stick with the idea of storing available slots, but change the way we store them (see screen 3).

Here we store the date in the first column as before. In the second column (StartSlot), we store the first free slot of any run of free slots and in the third (FreeSlots), we store the number of contiguous free slots. The data in this SpeedyBookings table stores exactly the same booking pattern as the DefaultBookings table. Slots one and two are booked, so the first row shows that the first free slot on 1 September is three. Slot four is booked, so the run that starts with slot three is just one slot long and the entry in the table looks like this:

01/09/2008 3 1

The next empty slot is five, the next booked one is 20, so there are 15 free slots:

01/09/2008 5 15

A day with no bookings is indicated like this:

02/09/2008 1 32

When a request is made for, say, a three-quarter hour slot, we simply search the FreeSlots column for the number of slots required. The NextAvailable query grid looks like screen 4.

It identifies occurrences of three or more free slots using the criterion >2 in the FreeSlots column. The BookingDate rows are sorted in ascending order to list the earliest date first, and StartSlot is also sorted in ascending order so starting slots are listed in time order through the day. On the menu ribbon, set the Return option to 1 so that it will return just the first row.

The SQL looks like this:

```
SELECT TOP 1 BookingDate, ↙
StartSlot, FreeSlots
FROM SpeedyBookings
WHERE FreeSlots >2
ORDER BY BookingDate, ↙
StartSlot;
```

Is this a good structure? Well, that depends. Like many database design decisions, it achieves the desired outcome by moving the workload around. We need a structure that can be queried quickly to find single and multiple contiguous slots: this table answers that need and querying will be fast. Adopting this structure will, however, add to the workload of updating. Each time a booking is made, an existing row will have to be deleted and either one or two new rows added. For example, if a booking was made on 1 September for slots 31 and 32, one existing row would have to be deleted:

01/09/2008 23 10

and one new row:

01/09/2008 23 8

added, but if slots 25, 26 and 27 were booked instead, two new rows:

01/09/2008 23 2
01/09/2008 28 5

would have to be added.

Also, despite being normalised to third normal form, there is the potential for 'conflicting rows' to occur in the table. For example:

01/09/2008 3 1
01/09/2008 4 1

are possible in this table and 'mask' the fact that there are two contiguous slots starting with slot three. And two like these:

01/09/2008 3 2
01/09/2008 4 1

contain confusing information because the state of slot four is recorded twice. We can work around all these problems by error-trapping and writing code, but that adds complexity that the simpler structures we used at the beginning don't have. But then, those structures are too slow.

So whether you consider this a good structure depends on whether you think the gain in querying speed is worth the pain of the added update and delete anomalies. In this particular case, speed was of the essence and this design was adopted. **PCW**

SCREEN 2

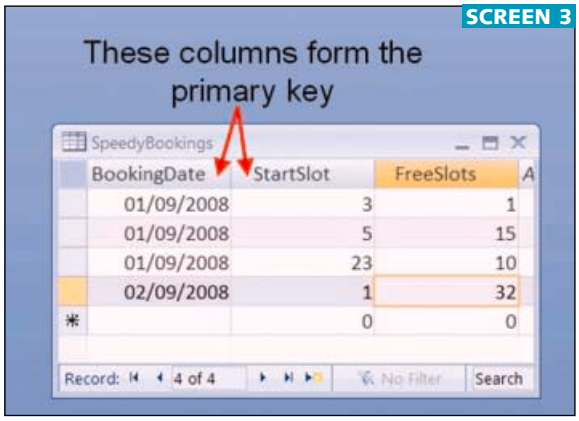
FreeSlots

BookingDate	FreeSlotNo
01/09/2008	3
01/09/2008	5
01/09/2008	6
01/09/2008	7
01/09/2008	8
01/09/2008	9
	0

Record: 7 of 7

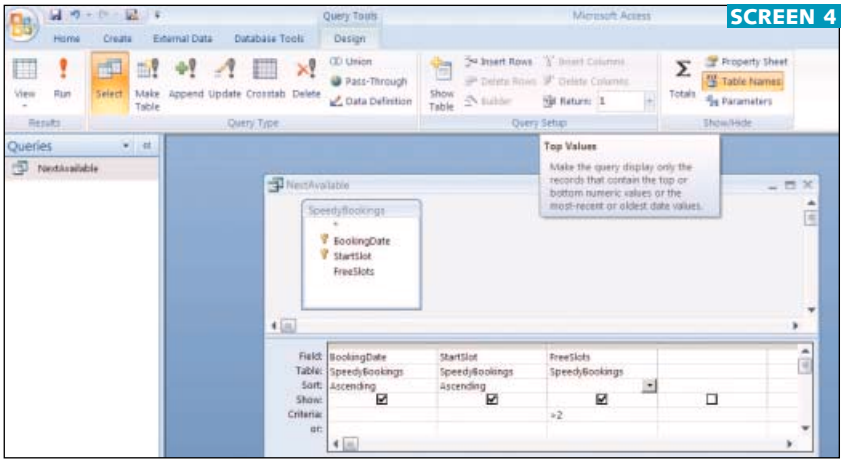
A second attempt at a table structure

SCREEN 3



This structure is optimised for rapid querying to find single and multiple free slots

SCREEN 4



This query returns the first available run of three or more contiguous slots

Tim Anderson is an IT journalist and software developer, and began writing for PCW in 1993. Since his first Commodore Pet, he has acquired expertise in Rad programming, Windows and the Internet.

→ Comments welcome on the Visual programming column.
Email visual@pcw.co.uk
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Searching solutions

How to add a search feature and display an image in Visual Studio

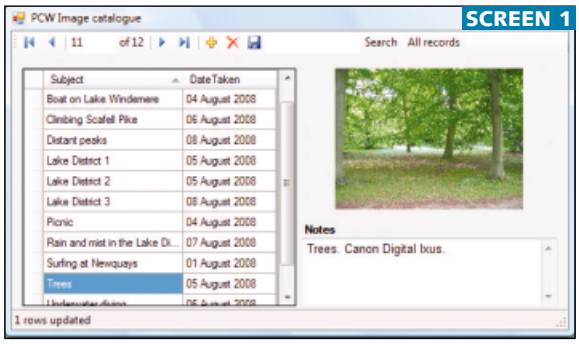
Last month's column showed two approaches to managing data in Visual Basic, using an SQL Server Compact Edition image catalogue as an example (see screen 1). The first approach involves constructing your own SQL statements, sending them to the database engine using SQLCeCommand and reading the results from a DataReader. The second technique uses Visual Studio's wizards to build a quick application; while it is less work than constructing SQL manually, it's not obvious how to progress from there. The wizard generates five components consisting of a BindingNavigator, DataGridView, DataSet, TableAdapter and TableAdapterManager. So, how do you add features, such as search?

It is time to take a closer look at these objects. Internally Visual Basic, or rather the .Net Framework, is still using SQL and DataReaders, it is just that these higher-level components hide this from you. Here's how it all hangs together.

The place to start is the DataSet, which is an in-memory database manager. When your application needs to read the data, it reads it from the DataSet. When it writes data, it writes it to the DataSet.

Since it is in memory, performance is generally excellent, although there are a couple of snags. First, since you are reading and writing data from an in-memory copy, it could be out of date. Second, loading a entire database into memory, which is what Visual Studio does by default, is inefficient for large databases.

A DataSet has no understanding of the connection to the source database manager or where its data comes from. Instead, the interaction with the database manager is done by the TableAdapter component. For example, the Fill method populates a DataSet and the Update method saves any changes or insertions from the DataSet back to the source database. Both these methods cause SQL commands to execute.



The *PCW* Image Catalogue, rapidly assembled in Visual Basic

The latest Visual Studio, or VB Express, wraps the TableAdapter in a custom class, such as PCWImagesTableAdapter, and adds a TableAdapterManager to deal with multiple TableAdapters for joined tables. It is not necessary to modify this code. Instead, work with the visual DataSet designer to change the behaviour of the DataSet and TableAdapter.

Adding search

Here's how to add a search feature. The first step is to add a text box and a button to the toolbar. The idea is that when you click the button, the DataGridView shows only records that match the search string somewhere in the Subject field of the database table.

There are two approaches you can take. If you loaded the entire database into the DataSet, it makes sense to search it. The easiest way is by setting the Filter property on the generated PCWImagesDataBindingSource object. Here is the code, which also updates a status bar with the number of hits:

```
Dim searchString As String = ↙
Me.txtSearch.Text.Trim
Me.PCWImagesBindingSource.↙
Filter = "Subject LIKE '%" + ↙
searchString + "%'"
lbStatus.Text = ↙
Me.PCWImagesBindingSource. ↙
Count.ToString() + " rows ↙
found"
```

(Key: ↙ code string continues)

The syntax for filter expressions is in the documentation for DataColumn.Expression.

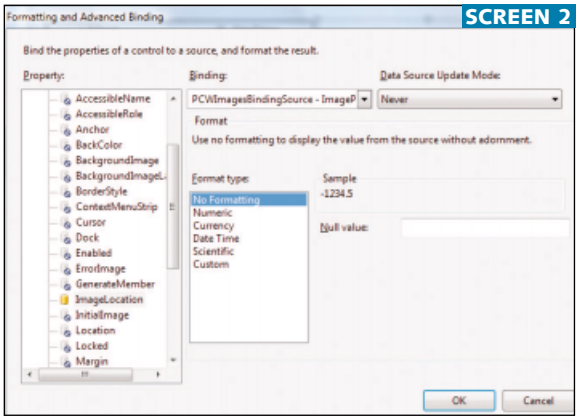
Alternatively, you can restrict the data retrieved from the database. To do this, open the DataSet designer. You will see a grid with a section showing fields from the database, as well as another section headed PCWImagesTableAdapter. This has one entry defining the Fill query. Right-click this row and choose Add query. Accept all the defaults in the wizard to create a new query called FillBy. Select this new row, then choose Properties, Parameters, Add. Add a parameter named Filter, change the type to String and click on OK.

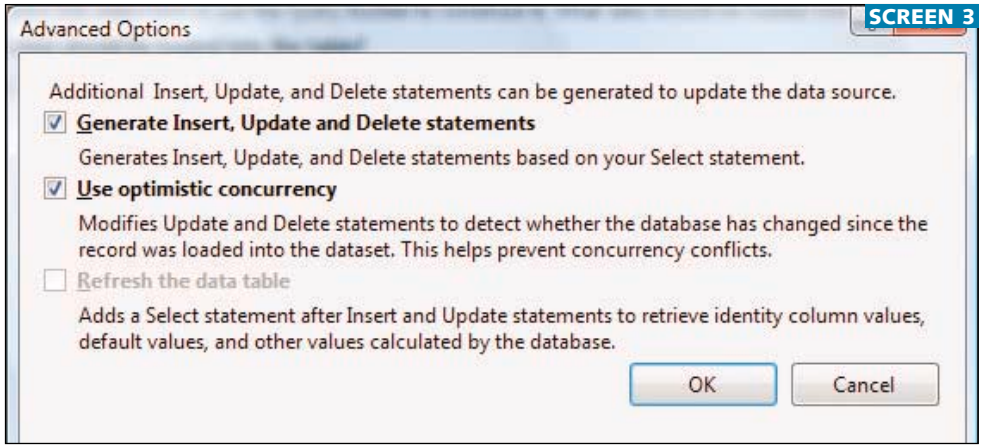
Now right-click the query row again and choose configure. Add the following line to the SQL statement:

```
WHERE Subject LIKE @Filter
```

What you have done is to define a new SQL statement for populating the DataSet. Instead of retrieving all the rows, it restricts them according to the expression you supply. This means you can rewrite the search function like this:

Binding the ImageLocation to an ImagePath field in a database





This disabled option can cause concurrency problems

```
Dim searchString As String =
Me.txtSearch.Text.Trim
Me.PCWImagesTableAdapter.
FillBy(PcwdataDataSet.
PCWImages, "%" + searchString
+ "%")
lbStatus.Text =
Me.PcwdataDataSet.PCWImages.
Count.ToString() + " rows
found"
```

If you do this, you will likely want to add an All records button that will clear the search. Either set the Filter to an empty string if you're filtering the DataSet or re-query the database if you have used the second approach. For example:

```
Me.PCWImagesTableAdapter.Fill
(Me.PcwdataDataSet.PCWImages)
```

Another point to watch is that any unsaved changes in the DataSet will be lost if it is refilled. You could use similar code to that given below for saving data on exit.

Displaying an image

The first step in displaying an image is to add an image path to the database. From the View menu, choose Database Explorer. Right-click the table name and choose Edit Table Schema. Add a new nvarchar column called ImagePath. Right-click the table, choose Show Table Data and add a valid image name to one or two rows.

The DataSet will now be out of date, so open the DataSet designer, right-click each query and add ImagePath to the Select statement.

Now add a PictureBox to your form. You need to bind its ImageLocation property to the ImagePath field. Expand the DataBindings property and click Advanced – this allows you to bind any property to any field. Select ImageLocation, then drop-down Binding and choose ImagePath. Set the UpdateMode to Never, since this is read-only (see screen 2). Finally, close this dialogue box and set the PictureBox SizeMode to Zoom. Run the application. Images will be displayed where they exist.

Saving data on exit

Visual Basic's wizards create a database application, including a toolbar with a save button. This writes changes back to the database (see box below). However, if you make changes to the data and then close the form without clicking Save, the changes are never written to the database. You can fix this with code such as the following in the FormClosing event handler:

```
If PcwdataDataSet.HasChanges
Then
 If MsgBox("Database has
changed. Save
changes?",MsgBoxStyle.YesNo)
= MsgBoxResult.Yes Then
  Me.TableAdapterManager.
UpdateAll(PcwdataDataSet)
 End If
End If
```

A problem with the application so far is that it does not handle concurrency problems. This issue crops up when someone edits the data after you retrieved the DataSet, but before you saved changes. If you're the only user of the machine this shouldn't matter, but unfortunately SQL Server CE has a limitation that can cause an exception.

This database engine only accepts one SQL Statement at a time, which is why, if you look at the Advanced Options of the TableAdapter, the option to Refresh the Data Table is disabled (see screen 3). The result is that when a new record is saved, the DataSet does not retrieve its generated identity value; the result of that is a concurrency error if you make further changes to that record. The only workaround is to write extra code to update the DataSet separately or use the brute-force approach of refilling the entire DataSet after an insert.

Where next?

Visual Basic is a powerful tool for working with data, although Microsoft has not made creating database applications as easy as it should be. There are snags with both the more intensive coding approach, as well as with the Visual Studio wizards.

Microsoft's object-relational tools, such as Linq to SQL, may make this easier, but they're not yet mature. On the other hand, a custom database application can soon earn back the time you spend on it by matching your needs more precisely than off-the-shelf packages.

Resources

Download the code for this sample from: **www.itwriting.com/pcw**
Visual Basic Express is available from: **www.microsoft.com/express/vb PCW**

Fixing disappearing data

There is an ugly problem with the way Visual Studio handles local databases. If you add a local database following all the defaults, you get a SQL Server CE database in your project. You may find, however, that all your updates mysteriously disappear. The problem is that Visual Studio generates the following connection string in the Application Settings:

```
Data Source=|DataDirectory|\pcwdata.sdf
```

The mysterious |DataDirectory| is substituted at runtime, with a variety of different locations, depending on how the application is deployed. On the desktop, it becomes the location of the executable, which means the runtime database is not where you thought, but rather in /bin/debug. Worse, it gets overwritten with the original database whenever the project is rebuilt. If this is not the behaviour you want, first select the database file in the Solution Explorer and change its Copy to Output property to Do not copy. Second, open the Settings designer and replace |DataDirectory| with a hard-coded location, or set it programmatically in the Application's Startup event handler:

```
AppDomain.CurrentDomain.SetData("DataDirectory", "[Path to your data here]")
```

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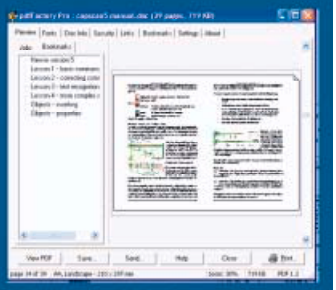

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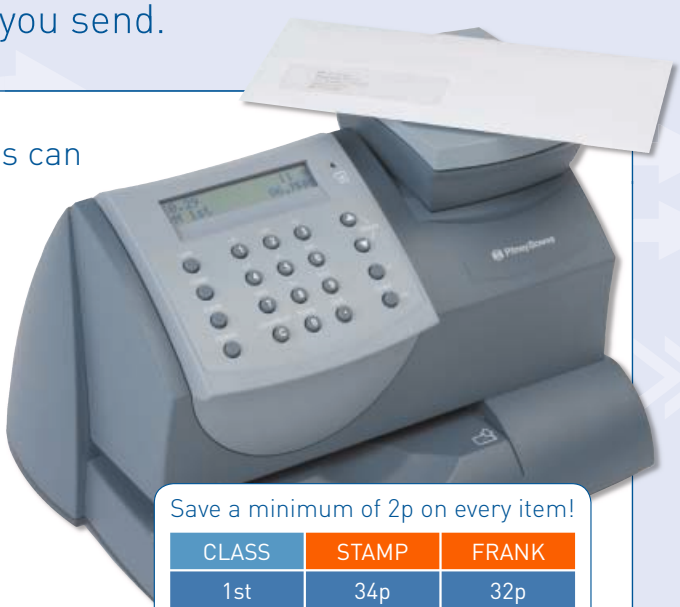

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ON THE 8GB DVD

NovaPDF 5.4 Lite ● Iolo Search and Recover 5 ● Paragon Total Defrag 2009 SE ● BB Flashback Express 2 ● Ashampoo UnInstaller Platinum 2 ● Mozilla Firefox 3

Let our workshops on the following pages show you how to use some of the software on the CD and DVD

SOFTWARE LISTING

ON THE CD

5 FULL VERSIONS
Iolo Search and Recover 5
Paragon Total Defrag 2009 SE
BB Flashback Express 2
Ashampoo Uninstaller Platinum 2
Mozilla Firefox 3

7 FROM THE MAGAZINE
Ability Office 5
Camtasia Studio 5.1
Iolo System Mechanic Pro 8
Magix Photo and Graphic Designer 2
Sequoiaview 1.3
Snagit 9

29 FREEWARE
A-squared Free 3.5.0.25
AOL Instant Messenger 6.8.10.1
Apple Quicktime 7.50.61
Batch It! v4.85
CDBurnerXP 4.1.2
Drivermax 4.2
Fast Dial 1.90
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Firetune 1.2
Flashgot 1.04
Floola 3
Foxytunes 3.0.2.1
Gizmo Project 4.0.3.374
IQ Notes 3.63
JAlbum 8.09
Malwarebytes Anti-Malware 1.17
nLite 1.4.7
Orbit Downloader 2.7.1
Phonetray Free 1.31
Piclens 1.7
Prospector Lite 6.5
Quicksys Regdefrag 1.4
Romeo Burner 2.3.2
Sib Icon Editor 4
Skype 4 beta
Songbird 0.6.1
Spamaware 5.02
Spywareblaster 4.1
Tab Sidebar 2.0.1

18 SHAREWARE
Active Desktop Calendar 7.52
Active Webcam 10.7
Clipmate 7.3.10
Easy CD-DA Extractor 11.5.3
Fineprint 2.8.5
iCash 4.4.1
IDimager 4.1.0.2
NovaPDF Pro 5.4.262
OrangeCD Suite 6.2.4
Revo Uninstaller 1.71
Side-By-Side Explorer 2.0
Signal 1.1.2
Skypesync 1.4
SMART Disk Monitor 7.0.0.30
Sugarsync Manager 1.1.4
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Total Uninstall 4.9.2
Updatepatrol 3.2

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Adobe Acrobat 9
Agnitum Outpost Security Suite Pro 2009
Ashampoo Powerup 3.20
Ashampoo Uninstaller 3.05
Kaspersky Internet Security 2009
Microsoft Expression Web 2
O&O Diskimage 3
Paragon Drive Backup 9
Personal
SnagIt 9
Spyware Doctor 6 with Antivirus
Tuneup Utilities 08 7.0.8007

8 LINUX & OPEN SOURCE
Arch Linux 2008.06
Finnix 92.0
Gentoo Linux 2008.0
Kubuntu 8.04.1
Opensuse
E Gnome 11 Live
OpensusE KDE 11 Live
Systemrescuecd 1.0.4
Ubuntu 8.04.1

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Note that we cannot give support for programs on the disc

Iolo Search and Recover 5

Retrieve deleted files with this professional data recovery tool

INFORMATION

System requirements Windows 2000/XP/Vista, 10MB disk space
Contact www.iolo.com
Registration Point your browser at www.iolo.com/casr
Need to know The program licence will expire 12 months after installation

The Recycle Bin is a handy first line of defence against accidental file deletions, but it's not perfect. There are many situations where you can delete something and not have it show up in the bin later, which is why it's vital that you have a file recovery tool installed. And not just any random piece of undeleting freeware, either: only a professional solution like Iolo Search and Recover will do.

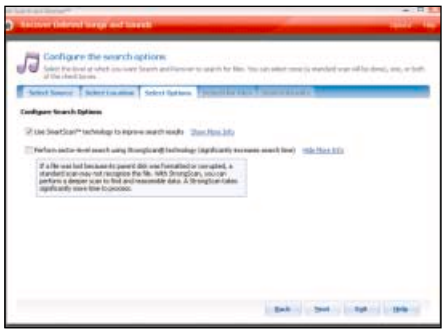
It's always a bad idea to carry on working with a drive that contains important deleted material, for instance, in case you overwrite them. Most undelete programs just warn you about this. Search and Recover also provides the ability to make an image of the drive, freezing its state at that point and ensuring you'll lose no more data. The program can compress this image to save space, then mount it in Explorer as a virtual drive and scan it for your lost files.

Search and Recover is more intelligent than most of the competition, for example recognising that files like TemporyJunk.tmp, stored in the \Temp folder, probably won't interest you. Sensible (though optional) filtering of results reduces all the usual clutter and means you see only the most important data.

The program can also scan hard drive sectors to recover damaged partitions or files whose index data has been lost. It has specific scans for pictures and movies or sounds and sounds that can preview files before you undelete them. And an email undelete tool can recover messages deleted from Outlook (97 or later), Outlook Express (5 or later), Thunderbird (1.5 or later) and more.

The quick and easy guide to recovering lost MP3 files

1 Iolo Search and Recover has a general 'recover deleted files' function that can undelete anything, but if you're looking for lost audio files than you'll get faster and more effective results from the 'Recover Deleted Songs and Sounds' module. Click Start and choose the location of your data to begin.



2 Click Next, select the drive to search for your lost files, and click Next to see the search options. If regular undelete tools have failed to find your data, check 'Perform sector-level search...' and the program will scan your all hard drive free space. This is effective, but beware, it can be very slow.

3 Click Next and watch as Search and Recover checks your hard drive for lost data. When it's done, click Filter > Custom to filter the list by name or date. Click Generate Preview if you're unsure about a file, and you'll be able to play it. Once you've found the file you need, click Recover to restore it.

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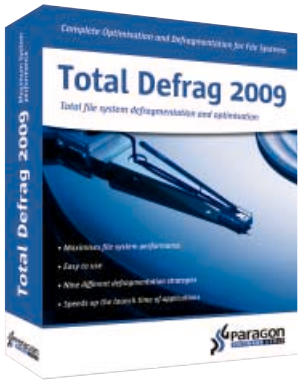


INFORMATION

System requirements Windows 2000 Pro/XP/Vista, 33MB disk space
Contact www.paragon-software.com
Registration Follow the instructions during the installation process

Paragon Total Defrag 2009 SE

Keep your hard drive running at top speed

Defragmenting your hard drive occasionally is a simple but effective way to keep your system running at peak performance, and if you're used to Windows own defrag tool then you might think you need nothing else. Try Paragon Total Defrag 2009 SE, though, and we think you'll change your mind.

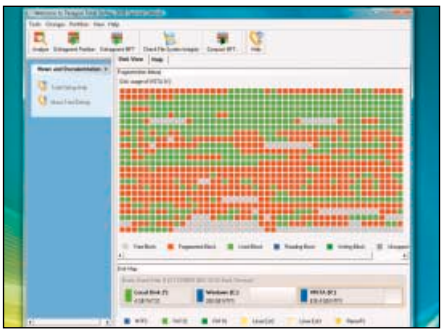
This program uses a much better interface, for instance, especially when compared to the Windows Vista defrag tool. It provides a quick visual indication of how fragmented your hard drive might be, and you get a prediction of how long defragging is likely to take.

Compatibility is excellent and the program works with a range of file systems: NTFS, Fat32, Fat16, Ext2, Ext3 and ReiserFS. You also get control over how the defrag is carried out, for example being able to place folders first on your hard drive where access times are at their best.

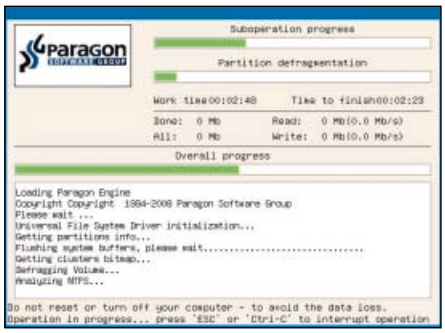
Paragon Total Defrag 2009 SE doesn't object if your hard drive is almost full, either, and works well even if you've only one per cent available. And because the program can run before your PC boots, it's able to defragment files that are normally in use.

The program's can also work with system data like the Master File Table (MFT). This index holds details of all the files on your hard drive (assuming it's formatted to use NTFS), and it can become fragmented, reducing system performance. Windows own defrag tool ignores the MFT, but Paragon Total Defrag 2009 SE can optimise it to ensure your hard drive is running at its best possible speed.

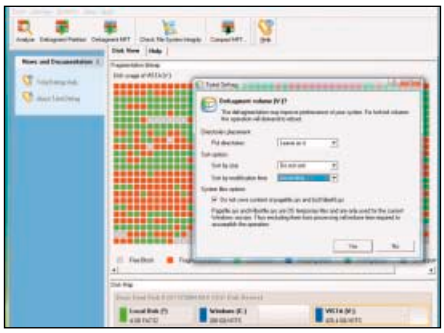
The three-step guide to faster PC performance



1 Launch Paragon Total Defrag 2009 SE and click the tab representing your system partition to see a map of your hard drive (red blocks indicate fragmented files). That will give you a quick idea about how fragmented your drive might be, but if you need more detail then there's an in-depth report on offer: click Analyze to see it.



2 If other applications have files open, you'll be invited to reboot your PC, and have Total Defrag 2009 SE inspect the hard drive before Windows starts. This allows the program to work with locked files that other defrag tools simply ignore. Do make sure you have a full current system backup before you start this process, however, just as you should before doing any low-level system operation.



3 Click Defragment Partition. Choose to put directories first if you've lots of folders on the drive (file searches will be faster), and use Sort by Modification Time to give faster access to files you're edited recently. Check 'Do not save...' to ignore temporary files like Pagefile.sys, speeding up the defragging process, then click Yes to begin.

READER OFFER

NEW FEATURES

Real-time drive backup
Effective disaster recovery
Migrate your data online
Securely erase your data
Powerful hard drive partitioning
Enterprise imaging and deployment

SAVE 20% ACROSS THE PARAGON RANGE

Total Defrag 2009 SE is just one of Paragon's feature-packed products. It also produces Drive Backup, a feature-packed image backup tool. Disk Wiper securely erases files so they can't be undeleted later. And Hard Disk Manager combines partitioning, backup, cloning, recovery and more into one comprehensive package. Prices start at around £13, and there's a 20 per cent discount available if you order within seven days of registering Total Defrag 2009 SE. See your registration email for the promotional code.

BB Flashback Express 2

Save screen activity as a Flash movie with this multimedia tool

INFORMATION

System requirements Windows 98/Me/2000/XP/Vista, 21MB disk space

Contact www.bbsoftware.co.uk

Registration Launch the program and click "Get a free licence online"

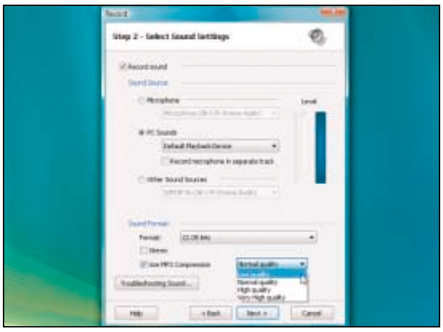
The traditional way of marketing software, documenting PC procedures or creating presentations relies heavily on screen grabs. It's quick and easy, but can also leave you with dated, static documents that appeal to no-one at all. If you're looking to produce something more up-to-date that will really grab people's attention, then you'll have to look elsewhere. And we have the ideal candidate.

BB Flashback Express 2 is a powerful screen recorder designed to create an attractive movie from your on-screen activities. Play the movie back later and mouse clicks are highlighted on the screen, making it easy for others to follow what you're doing. But if you need to explain some complicated point then there's also an option to add a commentary through your microphone, and the movie can include regular PC sounds, too.

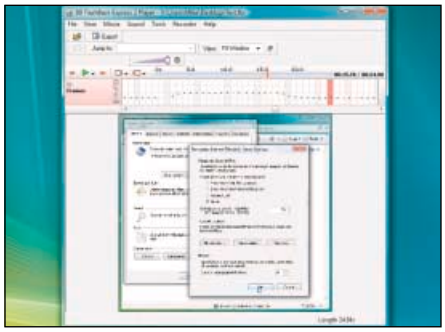
BB Flashback Express 2 uses several techniques to keep minimise movie file sizes. It can reduce screen resolution while you're recording, or present your movie as, say, a 320x240 pixel window that scrolls around your actual desktop. The program can also turn off Windows graphics effects, hide desktop icons and set plain wallpaper.

You get the most control when exporting your files in Flash (SWF) or AVI formats, though. There are options to reduce the movie from rate, scale it down, or apply your choice of JPEG and MP3 compression factors. You're able to choose from three different playback control bars, or even add a Flash version of your own, then export the results ready to use online.

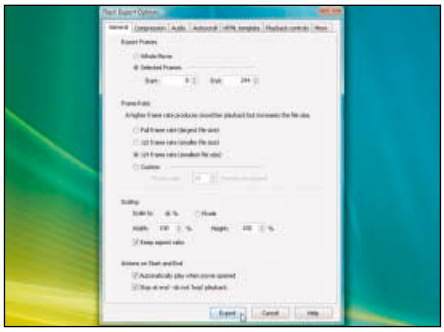
Tweaks and optimisations to deliver the perfect desktop movie



1 Set up the software you'd like to record, right-click the BB Flashback Express system tray icon and select Record. Check all the Display Settings options to keep the movie size small, and click Next. If sounds from your application are important then check Record Sound, select the PC Sounds option and choose Low Quality MP3 compression.



2 Work your way through the wizard, choose the area you're recording (full screen, a window or selectable region), click Finish and run through the software procedure you're recording. Right-click the system tray icon when you're done, save the file, then double-click it to open your movie in the Flashback Express player.



3 Click and drag in the Frames window to select the frames you'd like to use, then click File > Export to Flash. Click the General tab and select 1/4 frame rate if you're looking for a small movie (enable Autoscroll too), then click Playback Controls to choose your control bar. Click Export when you're done to create the Flash movie.

UPGRADE OFFER

NEW FEATURES

Add text, callouts, images, sound
Add/remove, cut/paste frames
Re-record the mouse cursor
Full frame-based editor
Create multi-track soundtracks
Export as WMV, EXE, PPT

UPGRADE TO BB FLASHBACK

BB Flashback uses the same powerful video capture engine that you get in BB Flashback Express, but provides many new ways to work with the movies you create. You're able to annotate them, for instance, with new sounds, text boxes, captions and images. A full frame-based editor lets you fix just about any recording problems, and along with Flash and AVI you can export the finished clips as WMV, EXE or Powerpoint files. It's all yours for a mere £19, and you can order from **www.bbsoftware.co.uk/store.aspx**

Ashampoo Uninstaller Platinum 2

Remove applications completely with this PC maintenance tool

INFORMATION

System requirements Windows 2000/XP/Vista, 13MB disk space

Contact www.ashampoo.com

Registration Leave "Get full version key" checked during installation, or launch the program and click Internet > Get Free Registration Key

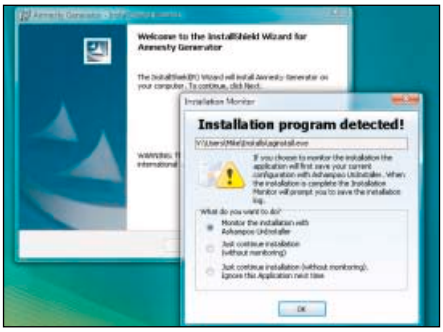
It's easy to install most programs. But removing them can be another story. Just about every uninstall program will leave at least some files, folders or Registry keys behind, cluttering up your hard drive and slowing the system down. You could try browsing through Explorer and Regedit and perhaps clean some of the junk yourself, but that's risky and time-consuming. It's much better to use Ashampoo UnInstaller Platinum 2, which will handle everything automatically.

Once set up the program will leap into action every time you install something. It takes two snapshots of your system, one before the installation program runs and one afterwards, then uses the differences to work out how your hard drive has changed. This information is stored safely away in an installation log file.

If you later tell Ashampoo UnInstaller Platinum 2 to remove this application, it will use the installation log to restore your PC. Registry entries, files and folders will all be restored to just how they were before the program was installed. If you've enabled the optional File Backup feature then you can even restore any original files that were overwritten by this installation.

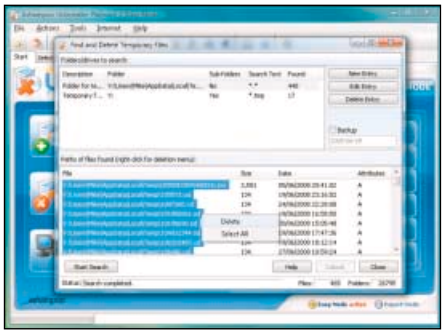
The program also includes a Check Shortcuts module that will scan your system for invalid links. There are search tools that can look for and remove duplicate or leftover temporary files. Another option will locate unnecessary empty folders, and there are also modules to manage Windows Services or IE addons. So if your PC is in need of a serious decluttering then this could be a very good place to start.

The hassle-free way to uninstall applications



1 Once installed, Ashampoo UnInstaller Platinum 2 will leave an Installation Monitor running on your system. When you run an installation program this will pop up and ask what you'd like to do. Check "Monitor the installation..." and it will record exactly what the program does, storing the results in an installation log.

2 If you decide to remove the application later, don't use the normal uninstall tool. Launch Ashampoo UnInstaller Platinum 2 instead, click Uninstall Logged Programs and choose the log for this program. Follow the instructions and the unwanted app will be wiped from your system, no clutter or redundant Registry keys remaining.



3 Ashampoo UnInstaller Platinum 2 can remove other unnecessary junk on your hard drive, too, from empty folders to broken shortcuts, duplicate files and more. Click Find And Delete Temporary Files, say, and the program will produce a list of leftovers for you. Right-click to select and delete the files, and free up some hard drive space.

READER OFFER

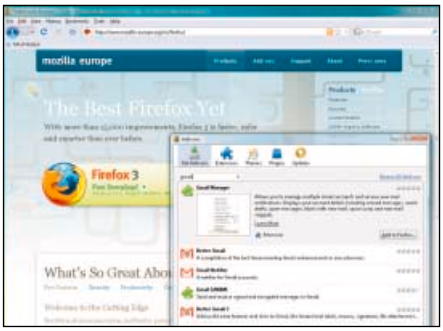
NEW FEATURES

Manage restore points
Defragment hard drives
Fast Registry cleaner
Manage Windows fonts
Delete your internet tracks
New, more intuitive interface

SAVE 75% ON ASHAMPOO UNINSTALLER 3

The latest version of Ashampoo UnInstaller adds many new system maintenance tools. You are now able to manage system restore points, clean junk from the Registry, defragment your hard drive, remove unwanted fonts, clear your internet tracks and more, all from a completely redesigned, easier to use interface. Regular buyers would expect to pay £29.99 for this, but as a registered owner of Uninstaller Platinum 2 you need only pay £7.49, an amazing 75 per cent discount. Click Internet > Upgrade to Ashampoo UnInstaller 3 to find out more.

Mozilla Firefox 3



INFORMATION

System requirements Windows 2000/XP/Vista, 52MB hard drive space
Contact www.mozilla.com/firefox
Registration Not required

Search and install add-ons from within the browser – just one of many new Firefox 3 features

After months of testing, squashing bugs and polishing the code, Firefox 3 has finally been released. At first glance you might wonder whether it's worth the upgrade, as the interface hasn't changed a great deal, but start exploring and the advantages soon become apparent.

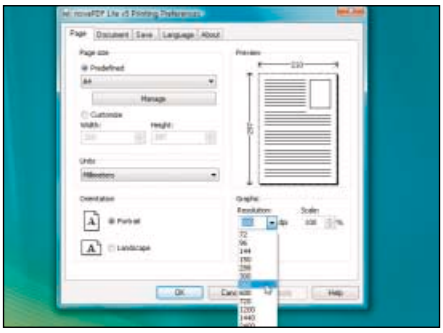
To the right of the location bar, for instance, you'll see a star. Click this and Firefox will bookmark the current page in a folder called Unsorted Bookmarks. If you hate filing, then the Unsorted Bookmarks folder could soon be overflowing, but type a word or phrase into the location bar and Firefox will search your browsing history, page titles, bookmarks and customisable tags, and display a menu of matching URLs. Check the View menu and you'll find Firefox can now zoom in or out of the current page. The Add-Ons Manager now lets you choose and install at least some add-ons directly and the Download Manager can pause and resume downloads.

Arguably the best new features are the ones you can't see. The support for a Google blacklist that protects you from malware and phishing sites, for instance. The enhanced web standards support means you'll see more sites and the reduced memory requirements and faster browsing speeds make this an essential upgrade.

READER OFFER
FREE ADD-ONS FOR FIREFOX

Firefox has more features than most browsers, but if you need more, take a look at the add-ons available. Would you like an integrated download accelerator? Easier navigation with mouse gestures? How about skins, macros, signatures and more for Gmail? A Digg extension that shows information on the site you're currently viewing? Thumbnail access to your bookmarks? Updates on your Ebay trading from within the browser? Find all this and more at the Firefox add-ons site (**http://addons.mozilla.org**). And what's more, they're all free!

NovaPDF Lite Desktop 5.4



INFORMATION

System requirements Windows 2000/XP/Vista, 3MB hard drive space
Contact www.novapdf.com
Registration Obtain your free registration key from **www.tinyurl.com/653hkv**

NovaPDF Lite Desktop 5.4 gives you plenty of control over your PDF file resolution

PDF files are compact and can be viewed on most platforms, making them an ideal choice when you're looking to distribute documents, so it's a pity that few applications can create PDF files directly. NovaPDF Lite Desktop 5.4 offers a way to remedy this by installing a virtual printer driver, allowing you to produce top-quality PDF files from just about any Windows application.

Just launch your application, open a file, choose the Print option and select the virtual NovaPDF printer. You'll be prompted to enter a file name, then a PDF file will be created and saved for you. The default settings are sensibly chosen and most of the time you'll never need to do anything else, but if you need more control then there are some useful options available. Open the Printers Control Panel applet, right-click NovaPDF Lite v5 and select Printing Preferences to view them.

On the Page tab you can choose the file resolution. This defaults to 300dpi (dots per inch), but you can drop it to 72dpi to produce small, low-quality files, or increase it to 2,400dpi for high-resolution documents.

The Document tab allows you to define the document title, as well as adding custom keywords and the Save tab contains options that can automate the process of saving your document, including the ability to automatically generate a file and folder name.

UPGRADE OFFER
SAVE 37% ON NOVAPDF PROFESSIONAL 5

Upgrade to NovaPDF Professional 5 and you'll be able to compress your PDF files by downsampling images. The ability to embed fonts in a document improves portability and you're able to define multiple text or image watermarks, then apply them to individual pages or the whole file. There's also support for creating clickable links within files and automatic generation of PDF bookmarks (protected with 40- or 128-bit encryption). The list price for NovaPDF Professional 5 is around £20, but you need only pay around £12.50. Visit **www.tinyurl.com/653hkv**.

COMPETITION

WIN! An Acer Blu-ray laptop and Arcon design software

Arcon is offering one lucky reader a copy of 3D Home Designer Expert and an Acer Aspire 5920G laptop, worth £600, featuring an Intel Core 2 Duo 2 GHz processor, 4GB DDR2 Ram, Windows Vista Home Premium, a 250GB hard drive and a Blu-ray optical drive.

Four runners up will also win their own copy of 3D Home Designer Expert, while four other runners up will win a bundle worth £55 comprising 3D Bathroom Designer, 3D Kitchen Designer and 3D Home Designer.

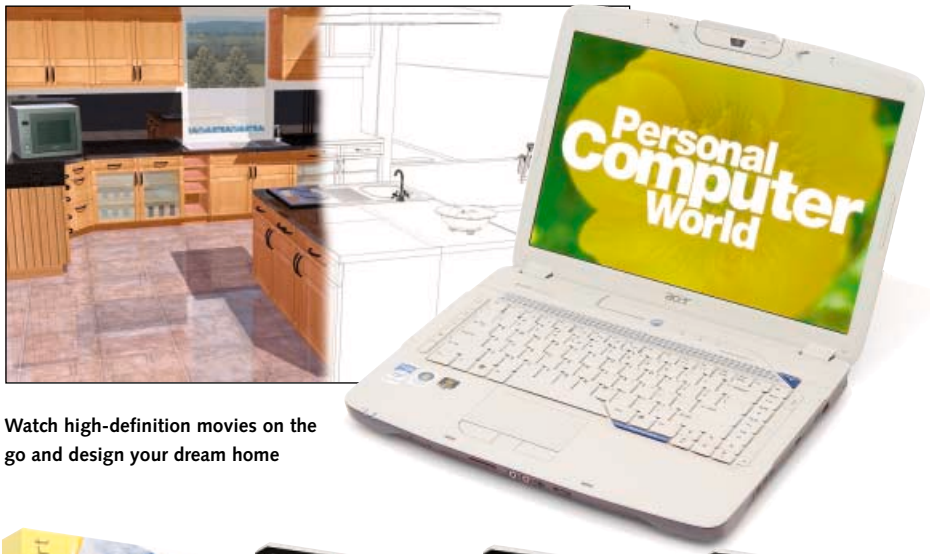
Have you ever thought what your dream home would look like? The new Arcon range of home design software products empowers you to create the exterior, interior and landscape of your perfect home. The software allows you to create 2D plans and high-quality 3D visualisations, easily and accurately. From basic remodelling of your existing kitchen or bathroom to a full scale self-build, Arcon spans a range of project sizes.

Titles in the product range include 3D Bathroom Designer (£9.99), 3D Kitchen Designer (£9.99), 3D Home Designer (£19.99), 3D Interior Designer (£34.99), 3D Home Designer – Expert (£49.99) and 3D Architect (£199.00).

The software allows you to use intuitive 2D drawing tools to initially bring to life your ideas before visualising them in a 3D environment. A wide range of objects – 4,800 in 3D Home Designer Expert – allow you to furnish and decorate your virtual home with rendered images demonstrating the effects of texturing, lighting and even shadows.

Finally, the 3D walkthrough feature allows you to examine your project in close-up detail and provides an impression of moving around the finished home or room.

You can change your mind at any point of the design stage and alter both small and large details at will, until you have your home design exactly as you want it. The product output can even be used to apply for outline planning permission before you instruct professional help. The Arcon range of software has sold more than 1,500,000 units since 2005 and is the leading consumer 3D Architectural Software in Europe.



Watch high-definition movies on the go and design your dream home

Arcon is the complete design solution for all home improvement and self-build projects. See **www.3darchitect.co.uk** for more information.

For your chance to win the Acer laptop and some fantastic Arcon software, answer the question below and enter online at **www.pcw.co.uk/competitions**. The competition opens on 7 August 2008 and closes on 6 September 2008.

How many objects can you use to furnish a project in 3D Home Designer Expert?

a) 100
b) 2,000
c) 4,800

This competition is open to readers of PCW, except for employees (and their families) of Incisive Media, Acer and Arcon. PCW is the sole judge of the competition and the Editor's choice is final. Offer applies to residents of the UK and the Irish Republic only. Entrants must be over the age of 18 and only one entry per household will be accepted. Winners will be selected at random from all correct entries received. No cash alternative is available in lieu of prizes. Incisive Media will use all reasonable endeavours to notify the winner(s) within 14 days of the close of the competition. Incisive Media reserves the right to substitute the prize for one of greater or equal value if circumstances make this unavoidable. Prizes will be dispatched by the competition sponsor(s) and the winner(s) name(s) and address(es) will be provided to the competition sponsor(s) for this purpose. No purchase of the magazine is necessary to enter the competition. Incisive Media will use all reasonable efforts to ensure that the prizes are as described on this page. However, Incisive Media cannot accept any liability in respect of any prize, and any queries regarding a prize should be taken up directly with the sponsor of that prize.

The winner of the July competition is Andy Richards of Manchester, who wins a Shuttle XPC G5 6801M home entertainment PC.

ENTER ONLINE AT www.pcw.co.uk/competitions

On the web

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10 tips for buying safely

1. Get written quotes from shops specifying components used, or print off and keep spec sheets from websites.
2. Use a credit card if possible for purchases of £100 or more; you could get compensation from the card company if a supplier goes out of business.
3. Keep good records, storing receipts, correspondence in one place.
4. In England and Wales, the onus is on retailers to prove that faults found within six months on purchases are not inherent.
5. Goods ordered online, by phone or post can be returned under the Distance Selling Regulations without explanation within a reasonable time – this is widely accepted as being seven days.
6. Open and inspect all goods as soon as possible after delivery and make sure they work.
7. Companies are not obliged to repair or replace goods damaged by accident or misuse, unless it is caused in transit by a delivery service.
8. Companies cannot charge for a service that isn't being delivered, but never stop a direct debit while under contract.
9. Consumers should not suffer financial loss for repairs that are not their fault, so claim back carriage charges.
10. If a dispute arises, take advice from Consumer Direct at www.consumerdirect.gov.uk.

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NEXT MONTH

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Print, scan and copy

Multifunction devices save you having to buy a separate printer, scanner and copier, thus freeing up space on your desk. But how easy are they to use? We look at the latest high-end inkjet models capable of producing quality photo prints.

High-definition camcorders

Now cheaper than ever, high-definition (HD) camcorders are the perfect way to record those special events, perhaps to watch on your HD-ready TV. We road test eight of the best new models, starting at just £350.

Extend Windows XP

With Windows Vista struggling to gain converts, Windows 7 not due until 2010, and official support for XP dwindling, how can you make sure your XP PC will remain trouble-free for the next year or two? Don't miss our guide to keeping XP as fresh as the day you installed it.

The ultimate home server

There comes a time in any home network's life when you realise that a dedicated server would make your life much simpler. We explain what a server can do for you and how to choose the best setup for your needs.

There's lots more in November's PCW
DON'T MISS IT...

OCTOBER 2003

From the archives: Take a look at the important events in technology five, 15 and 25 years ago.

We were reeling from the effects of the US Digital Millennium Copyright Act in October 2003, with our Editor Dylan Armbrust kicking off the issue saying innovation would be sacrificed by such laws. He said: "One could be charged for tampering or interfering with the Xbox by taking an axe to it, regardless of the fact that you bought the thing." Thankfully, though, his deepest fears haven't come to pass: "We could see the days of home innovation and fun tinkering die away, and that would be a tragedy."

In news, we reported that South Korea's largest mobile network provider, SK Telecom, was to sell a ringtone that was inaudible to humans but unbearable for mosquitoes. It never made its way to Europe and, despite reportedly being effective, it reduced battery life as much as playing any other ringtone would.

This issue also saw the birth of the portable media player, Archos' AV320. Its 20GB hard disk, 3.8in screen and palatable three-hour battery life was a revolution in mobile watching. It was only the £550 price tag that put us off.

OCTOBER 1983

"The unbeatable TI Home Computer. It's all the computers your family will ever need." That's a pretty bold statement for a machine with only 16KB of Ram (expandable to 52KB) and for which a "floppy disk memory system" was an optional extra. Still, 1983 was an era of both discovery and naivety, and back then a 16-bit machine was the height of sophistication.

That extraordinary claim was made in an advert, while over in the reviews section we grappled with the intricacies of Sage 400. "Most accounting packages, integrated or otherwise, quote prices per module that are within pounds of the figure quoted by Sage Systems Limited for its complete suite," we gushed in its review. How times have changed – Sage now has one of the most expensive offerings on the market.

And who would believe that it is 25 years since the launch of the Acorn Electron? In 1983 we spent five pages marvelling over the £199 wonder. The machine impressively supported modes up to 640x256-pixel resolution in two colours and featured a full-size keyboard.

OCTOBER 1993

October 1993 saw the first appearance of PCI (Peripheral Component Interconnect), the new local bus. The design separated the processor and memory from other devices in the computer, and promised 'plug-and-play' configuration of card settings. Without having to share bandwidth with hard disks and video cards, the processor could work without interruption. Our testing certainly bore this out, as the systems felt faster than a Pentium at a fraction of the cost. When Intel decided to make PCI an open standard, it helped to ensure its success.

The CD-Rom was starting to make its presence felt, with a group test of reference works by Tim Nott. Regionalisation was an issue, and the Hutchinson Encyclopaedia won respect for covering Britain in more detail than Encarta or Grolier.

Finally, we looked at the rivals to CRT monitors. LCD-based displays are now popular, but in 1993 they were still expensive. Dr Alan Knapp of Philips Research Laboratories predicted that the CRT would be around for longer than they were.

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